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TRANSACTIONS

OF THE

INDIANA

State Medical Association

1904

FIFTY-FIFTH ANNUAL SESSION

HELD IN

INDIANAPOLIS, INDIANA

Thursday and Friday, May 19-20, 1904

INDIANAPOLIS, INDIANA:
WM. B. BURFORD, PRINTER AND BINDER.
1904.

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PREFATORY.

As this volume goes to press, the Secretary, Dr. F. C. Heath, reports 2,107 paid and registered members. As a number of copies of the transactions are preserved in libraries, home and foreign, it is necessary to print 2,200 copies of the present issue. The volume contains the scientific papers and the usual reports of committees, the names of the 525 members attending the meeting, the officers and members of the county societies and the alphabetical list and addresses of the members.

The large number of papers presented and the unusually large attendance led the Committee on Scientific Work to divide the papers so as to form three sections: a General Section, a Medical Section, and a Surgical Section. The first General Session was held Thursday morning and was devoted to an extended and valuable symposium on tuberculosis, and a discussion on medical education. The latter was incited by Professor Stanley Coulter, of Purdue University, who read a paper on Later Day Tendencies in Medical Education, which led to the consideration by able educators of every phase of this important feature of medical progress.

The second General Session was on Thursday evening. It was open to the public, who listened with pleasure and profit to the address on "Organization in the Medical Profession," by the President, Dr. Jonas Stewart, of Anderson, and the address of the Guest of Honor and orator of the evening, Dr. W. A. Evans, of Chicago, on "What the Community is Doing and Can Do for Tuberculosis." These addresses were followed by a general reception, with music and refreshments.

The final General Session was on Friday afternoon and was devoted to both general and social topics and the installation of the President elect, Dr. McCoy, of Columbus.

The Medical Section met on Thursday afternoon and Friday morning in the Auditorium, and the Surgical Sections met at the same hours in an adjacent lecture room. This arrangement gave ample time for valuable discussions of the papers. These are presented and have added to the bulk and value of the present issue greatly.

The report of the House of Delegates, the lists of counties, the alphabetical list and the reports generally have been prepared and edited by the Secretary, Dr. Heath, to whom the Editor and the Society are under continual obligation for painstaking care and efficiency.

The Constitution and By-Laws are not presented in this issue, as they were published last year, and the committee think that the publication in alternate years is sufficient. The list of attendants at the Indianapolis meeting is published in accordance with a resolution to that effect at the Evansville meeting.

Dr. Kemper, of Muncie, prepared the report on Necrology, the usual custom of a page to each deceased member being observed.

A number of papers and some reports read at the Society or referred by title do not appear, as they were not sent to the Editor or Secretary. Most of the papers and discussions have been already published in local State journals, but these appear as a permanent record in the Transactions. In the past they have been frequently employed in the preparation of papers reflecting the histories of American medicine and the part borne by Indiana in the progress of the last half century.

Of the charter members of the Association we are glad to report the good health and well being of the three members still living, Drs. P. H. Jameson and W. H. Wishard, of Indianapolis, and Dr. Thomas W. Florer, of Waxahachie, Texas. Each of these was a surgeon in the late Civil War, and for nearly sixty years these have borne the part of the highest citizenship. They have fought the good fight of life and are still in practice, meeting the old definition of the physician given by Hippocrates, "a good man skilled in healing."

The next meeting of the Association will be held June 7, 8 and 9 at the West Baden-French Lick Springs and Health Resorts. The members of the House of Delegates will meet Tuesday evening at 8:00 o'clock, at the West Baden Hotel, and the regular sessions will begin on Wednesday morning.

There are 92 counties in the State of Indiana, of which 89 are organized as affiliated Societies of the Indiana State Medical Association. Only Brown, Ohio and Warren counties are unorganized; these are now in relation with adjacent counties, and will, no doubt, be organized before the June meeting.

The officers of the State Association earnestly request the Secretaries of the various counties to make it their personal pleasure, as it is their personal duty, to see that each member of the county societies receives his volume of the Transactions promptly, so that they may accomplish the result for which they are printed, and that is to be in the libraries of every member of the State Society, as a means of knowledge, pleasure and necessary reference. Each member has paid for his volume and is entitled to it immediately.

Dr. A. E. Bulson, the efficient Secretary of the Council of the State Society, announces that Dr. J. N. McCormack, of Kentucky, the Official Organizer of the National Association, will work in Indiana to secure a still larger membership of the State Society. It is earnestly hoped that the various officers of the county societies will give this work all the assistance in their power, so that the beneficence of professional organization and mutual helpfulness may permeate and affect every physician in Indiana. Indiana has over two and one-half millions of people under the medical care of some 5,000 physicians. We have two-fifths of this number, over 2,000, in our State Society membership. It is believed by the friends of medical organization, that by the exercise of a fraternal spirit and the use of kindly persuasion that the list may easily be increased to 3,000 members. Those physicians outside of the Society need the Society more than the Society needs them. Our cause is just and beneficent; let us all work to the end of unity and helpfulness.

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PRESIDENT'S ADDRESS.

THE ORGANIZED MEDICAL PROFESSION, AND ITS RELATION TO THE PUBLIC WELFARE.

BY JONAS STEWART, M.D., OF ANDERSON.

Fellow Members and Guests of the Indiana State Medical Association:

Our By-Laws require that the president shall deliver an address at such time as the Committee on Arrangements may designate. I assume that the object of this requirement is not to exploit the president, but to give him an opportunity to report on the condition and needs of the association, or to endeavor, in some other way to promote its interests.

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They have fully presented its importance, its objects, and benefits, and I shall therefore confine my remarks to the expression of a few thoughts on organization and the relation of the organized medical profession to the public welfare.

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zation, "Should be made the instruments for cultivation of fellowship, for the exchange of professional experience, for the advancement of medical knowledge, for the maintenance of ethical standards, and for the promotion in general of the interests of the profession and the welfare of the public." In their ultimate analysis, these brief statements will be found to embrace all that is expressed in the more elaborate verbiage of the constitutions, and, therefore, they shall serve as the text for a brief review of the objects of the organized medical profession as it now exists.

1. The Cultivation of Fellowship.

At first glance, an organization for this purpose seems selfish, and for the sole benefit of its members. It will be found, however, on closer study, that companionship, and the mutual interests of the individuals of an organized body, may result in the promotion of the welfare of others. Charles Lamb was once asked if he did not hate a certain person who was named by the querist. The great essayist answered, "How can I hate him? I know him." In the medical profession, as in other walks of life, much trouble would often be avoided, if we knew each other better. A popular Southern lecturer, in one of his public addresses, expresses the opinion, that if the great railroads of our country had been built north and south, instead of east and west, the great Civil War would not have been fought. His argument is that if the railroads had run as suggested, "The people of the sections would have mingled with each other; and people who mingle with each other, come to know each other; and people who know each other, learn to respect each other; and people who respect each other, soon love each other; and people who love each other, never fight each other." This principle is found to apply in the medical profession, and "fights" among doctors may be prevented in the same way. Those who habitually attend the medical societies, become acquainted and learn to respect each other. Such association and respect will eventually end the jealousies and animosities which are apt to arise between competitors, and instead of enmity, a spirit of fraternity will prevail. Intimate association will tend to soften the asperities of professional life and beget mutual respect and confidence. This will always

make us willing and ready to aid each other in emergencies. There is no class of men who need each other's assistance more than physicians, who are daily called upon to solve the great problems of life and death. The celebrated Greek poet Menander said, "It is not life to live alone. Let us help one another." It is apparent how such a spirit of helpfulness will contribute to the welfare of the public.

2. The Exchange of Professional Experience.

We can also easily see how the public may be benefited by the attainment of the second object of medical organization as above enumerated, the exchange of professional experience. Experimental knowledge can not be obtained from libraries. Years of experience in the treatment of the sick imparts a knowledge which can be gained in no other way. The recent graduate may excel in the knowledge of scientific facts, and yet lack the intuitive perception which comes only with experience. A physician of large experience gains a training that makes him a more logical thinker and helps him to forecast the future of a case with more accuracy. He learns that certain combinations of symptoms are usually followed by certain definite results, and his judgment is, therefore, less likely to be erroneous. The organized society is, in a measure, a post-graduate school where the younger men can learn from the experience of the elders, and the latter in time, may profit by the superior technical knowledge of the former, who have enjoyed greater advantages. Thus both are made better physicians, and the public, whom they both serve, is thereby benefited.

3. The Advancement of Medical Knowledge.

This is the great central object of all medical organization. The discovery of nature's secrets is one of the grandest and most beneficent works in which man can engage. He who discovers a scientific truth, makes known a thought of God for the benefit of man.

The late Dr. Thos. B. Harvey, of revered memory, when president of this association, in his annual address called attention to the minutes of its first annual meeting, which record that they adjourned to meet at "early candle lighting" to hear the address of the president. Although he commended them for being thor-

ough in the cultivation of what was then known, the good doctor indulged in some commiseration for the fate of our fathers who were doomed to work in the "dim candlelight of medical knowledge," and exulted that they were then under the blaze of the gaslight. Less than a quarter of a century has passed since Dr. Harvey thus commented on this item in the minutes, and it is no disparagement of the splendid attainments of the genial doctor and his coadjutors, nor yet of the brilliant achievements of our fathers of the former generation to say that we now find ourselves under the white light of the electrical age of medicine. Who can "cast the horoscope" of the coming ages? What illuminant shall typify the radiant splendors of the latter half of the twentieth century? Do we behold in the wonders of radium a faint prophetic symbol of their brilliancy? We are sure that if the present rate of progress shall be maintained the new century shall not grow old ere the electric blaze of today shall be as nearly eclipsed as is now the "candlelight" of our grandfathers. Who can estimate the value of the benefits conferred on humanity by the advancement of medical knowledge? Let us briefly consider a single disease, smallpox, once the world's greatest plague. All civilized nations are becoming immune from its ravages, so that the people now living can scarcely comprehend the awful fact that a little more than a century ago the human race was carried off in such numbers by this destroyer, that it was regarded as the most terrible of all the ministers of death. To estimate the benefits of this immunity it is necessary to recall the facts of history. "One-third of the population of Iceland died of smallpox in a single year, 1707. Two-thirds of the people of Greenland likewise perished in 1734. Three and a half millions of the people of Mexico died in a single epidemic. Whole races of human beings were carried off by it in Brazil. During 100 years preceding the discovery and practice of vaccination, it is estimated that 50,000,000 died of smallpox in civilized Europe. It was calculated that 30 per cent. of all children born, died of this disease before the end of their first year. Not only did it kill so large a part of the population, but it also disfigured or permanently injured many others. Prior to 1800, most

of the inmates of the blind asylums in England had lost their sight through its ravages.

Who can compute the value of exemption from pain through the discovery of anæsthesia? Although in this we must divide honors with the dentists, its real worth was established by the medical profession. The year after the demonstration in the Massachusetts General Hospital, Oliver Wendell Holmes said to his students, "The knife is searching for disease, the pulleys are dragging back dislocated limbs, nature herself is working out the primal curse which doomed the tenderest of her creatures to the sharpest of her trials, but the fierce extremity of suffering has been steeped in the waters of forgetfulness, and the deepest furrow in the knotted brow of agony has been smoothed forever." Only eight years before this, Velpeau wrote, "The escape from pain in surgical operations is a chimera which it is idle to follow up today; knife and pain in surgery are two words which are always inseparable in the minds of patients, and this necessary association must be conceded." Yet in a few years after the great surgeon wrote these words, ether and chloroform both appeared and banished pain forever from the operating table. It is said that Sir James Simpson, while a medical student, was so overcome by witnessing the suffering of a Highland woman undergoing a surgical operation, that he resolved to abandon the profession, thinking he could never endure such sights. Happily for suffering humanity, he changed his mind, and determined to devote himself to the discovery of something to alleviate the sufferings of those who must be subjected to the knife of the surgeon. The result the world knows.

The discoveries in hygiene and sanitation have also brought many blessings to the human race. For 500 years, from the twelfth to the seventeenth centuries, Europe was periodically devastated by terrible epidemics, such as the plague, or "Black Death." Fed by the squalor and filth everywhere prevailing, this destroyed the people in countless numbers. It is said that 25,000,000 died in Europe from its ravages. In civilized countries, under the sanitation of the present day, such things are impossible.

Time would fail me to tell of the work of the bacteriologist, and

the blessings of antisepsis and asepsis, which have brought a still larger measure of benefit to a suffering public.

4. The Maintenance of Ethical Standards.

When the code of ethics was revised last year, some physicians exulted in the fact, as they assumed, that we no longer have a code. The change in its title, and its having been made suggestive and advisory, only, instead of compulsory, seemed to give them as much pleasure as some of the editors and newspaper reporters enjoyed upon the publication of the revised version of the Bible a few years ago, when they announced in their columns that the committee on revision had abolished hell. A better acquaintance with the revised version taught them that while the translation of one word had been changed, another retained the old rendering, implying the continued existence of the unhappy state. Likewise the physicians who congratulated themselves that there was no code, found later, that we still have "principles," and that ethical standards are to be maintained. The old code was a noble instrument, and it subserved a noble purpose. Its moral principles were aptly expressed, and met the conditions at the time of its adoption; but conditions have changed in the last half century, and it was wise to make a restatement of the ethical principles which should govern physicians in their relations with their patients and their brother practitioners. It is written in Principles of Medical Ethics, "There is no profession from the members of which greater purity of character and a higher standard of moral excellence are required than the medical." Again, "No scientific attainments can compensate for the want of correct moral principles." And yet again, "It is incumbent on physicians to be temperate in all things." What member of the body politic, who, in a dire emergency, needs the help of a "steady hand," an "acute eye" or an "unclouded mind," would object to the maintenance of these ethical standards? It is apparent also that the attainment of this object of medical organization promotes the public welfare.

5. The Promotion of the Interests of the Profession and the Welfare of the Public.

The promotion of the interests of the profession, promotes the

public welfare, because if the physician does not prosper in his material and financial interests, he is unable to equip himself for efficient service. That the profession is actuated by sincerity of purpose in its desire to promote the public welfare is evidenced by its concerted efforts in all lands, to prevent and eradicate disease. In the business affairs of men there is no parallel to this unselfish work. In no other calling, do men seek to destroy the sources of their own profits, without hope of reward, for the public good. The history of preventive medicine is a narrative of the efforts of the profession to sacrifice its own interests for the public welfare.

Our greatest triumphs in the future will be won in the fields of preventive medicine and immunity. During the first quarter of the twentieth century these triumphs are destined to eclipse even the brilliancy of the achievements of modern surgery during the last quarter of the century that has gone. May we not indulge the hope that ere long we shall gain the mastery over all contagious and infectious diseases? And that sanitary science shall become so perfected that the average length of human life may again approach that said to have been enjoyed by the patriarchs of the antediluvian age? If this seems to us visionary and utopian, let us not despair, but take courage from the words of Thoreau, who said, "If you have built castles in the air, your work need not be lost; that is where they should be. Now put the foundation under them." This is our duty and our destiny. The organized medical profession is the vanguard of the great army of progress which is "prolonging and adding comfort to life."

Our splendid national organization began its work in 1847. Its most prominently avowed objects were the advancement of medical knowledge, and the elevation of the standard of medical education. After a century of effort, medical organization failed to meet the expectations of its friends. There was general lack of co-operation. The societies in the different States were organized on different plans, and the State and county societies, in many of the States, were independent of each other. At the close of the century it was found that not more than one physician in every four, was a member of any medical organization. Reorganization upon

a uniform basis was inaugurated at the meeting of the American Medical Association in 1900. The report of the committee was adopted the following year, and our splendid reorganization movement, therefore, dates from the beginning of the new century. This association adopted the new constitution at the last annual meeting. During the year we have made substantial progress. There has been a gratifying increase in our membership. Much work has been done. The Council is entitled to all praise. There is much yet to be accomplished. We should not be beguiled into inaction by our present prosperity. Our efforts should not be relaxed until every reputable practitioner in the State is enrolled.

Plutarch informs us that in the mythology of the ancient Egyptians, one of their deities, Osiris, was believed to have been taken by Python, and his body concealed in a casket, which was set afloat upon the river Nile. That it was carried down by the current of that stream to the Mediterranean, and drifted to Byblos in Phœnicia, where it was built into the column of a temple. Here it was subsequently found by his faithful consort, Isis, and returned to Egypt. Again it fell into the hands of Python, and was dismembered into fourteen fragments. These were scattered over the country and burned in different places, but were again all found by Isis, who recomposed and revivified the body, and Osiris became the chief divinity, as ruler and judge of the invisible world.

Likewise medicine, purloined by charlatans, built with the temples of superstition, dismembered by sectarianism, buried in the ignorance of the dark ages, found by scientific investigation, will be reunited and revivified by medical organization and will become the greatest and most useful of the sciences. Its "truth, though hewn into a thousand fragments, and scattered to the four winds of heaven, shall be gathered limb to limb, and moulded with every joint and member into an immortal feature of loveliness and perfection."

WHAT THE COMMUNITY IS DOING AND CAN DO AGAINST TUBERCULOSIS.

BY W. A. EVANS, M.D., OF CHICAGO.

[An address before the Indiana State Medical Association and the public, May 19, 1904, in the theater of the German House, Indianapolis.]

Tuberculosis is a mildly contagious moderately severe bacterial disease, and is both preventable and curable. By reason of its wide distribution, the length of illness entailed, the degree of helplessness of its subjects, its reciprocal relations with other questions of hygiene and community interest and the possibility of remedy, it is the greatest economic problem of the age.

The question of cure and the question of prevention in a case of tuberculosis are very much the same. Unfortunately there is but slight probability that a specific will ever be discovered for consumption. The life history of the disease differs materially from those of antitoxin diseases; for example, diphtheria or pneumonia. Furthermore the phagocyte plays but small part in the disease. When pulmonary consumption is cured it is by the walling-in of the bacillus by connective tissue, a productive inflammation. The results of this overgrowth are that the blood vessels are obliterated, the lymph vessels are stopped up and the underlying tissue is packed with new-grown connective tissue. Within this wall the tubercle bacillus remains potential though not active for an indefinite length of time. A study of a tubercular lung shows the enormous effort that the lung has made to wall off the tubercle bacillus; but you are to understand that the effort is to wall off, and there is but little evidence of active effort in the direction of the destruction of the bacterial factor. In the cure of the disease as well as in its prevention the factors in the fight, other than the bacillus, overshadow the micro-organisms. In every consideration of the

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PRESIDENT'S ADDRESS.

THE ORGANIZED MEDICAL PROFESSION, AND ITS RELATION TO THE PUBLIC WELFARE.

BY JONAS STEWART, M.D., OF ANDERSON.

Fellow Members and Guests of the Indiana State Medical Association:

Our By-Laws require that the president shall deliver an address at such time as the Committee on Arrangements may designate. I assume that the object of this requirement is not to exploit the president, but to give him an opportunity to report on the condition and needs of the association, or to endeavor, in some other way to promote its interests.

I shall therefore, call you attention, for a short time, to one phase of the subject which has been most prominent during the past year. The great work committed to our hands by your action at the last annual meeting was organization. The subject of medical organization has been discussed by many others, and in an especially able manner by Drs. McCormack and Simmons of our National Committee on Organization.

They have fully presented its importance, its objects, and benefits, and I shall therefore confine my remarks to the expression of a few thoughts on organization and the relation of the organized medical profession to the public welfare.

Let the organized medical profession be judged by what would result from the attainment of its avowed objects. What then, are the aims and purposes of our organization? These are all fully set forth in the constitutions of the American Medical Association, and the various State and county societies. But there is a more concise, and sufficiently comprehensive statement of them, in the third section of the second chapter of the Principles of Ethics, when it is declared that the county societies, the units of the organi-

Central Office. The central office is under the immediate observation of an enthusiast in this work, Dr. A. C. Klebs. If you accept my advice it will be not to undertake any tuberculosis work until you have first found an enthusiast such as Dr. Klebs. The central office is the co-ordinating office. In addition statistical studies, diagrams and maps are made from the white cards, model maps of infected houses, street maps of infected premises and similar notes of various and sundry kinds. A catalogue index of tuberculosis literature is kept.

Sanitaria. Up to this point our plan is coldly elaborate. We hope that before very long we will have funds at our disposal by which unpretentious neighborhood sanitaria or homes can be established. Personally I believe in shacks scattered here and there on vacant ground and offering tubercular people an opportunity to leave crowded bedrooms and sleep in the open air. These can be constructed at an expense of about from $50 to $80 apiece, and I know of no hospital plan that is so economical. It is contemplated also at some future date that we shall be able to find other occupation for those whom we think it advisable to change their occupation, and fit habitation for those who are living in unsanitary surroundings.

I think that, at this point, I can, with some propriety, discuss with you certain tuberculosis questions. The first of these is inherited tuberculosis. Inherited tuberculosis is association tuberculosis. By this I do not mean incidental contact but close association, and assuredly nowhere is association more close than between tubercular mother and her children, or between tubercular children and their brothers and sisters. In a study of this disease our work has shown us that the first and most fundamental condition is the home. There are two reasons for this: the first is, the intimacy of association between the members of a family occupying a home in common, and the second is, the element of house infection. Tubercle bacilli in the sunlight or in the air die very quickly, as the work of the Denver Board of Health amongst others, has shown, but tubercle bacilli in a dark or damp bedroom lie dormant but potential for an indefinite length of time. Dr.

Sachs' study of tuberculosis in the Ghetto district of Chicago has shown that in those homes where several families occupy the same house that the disease spreads about the same between families as it does between members of the same family. Another phase of the question to which as yet we have directed but little attention is the workshop or other work places, and again in quoting Dr. Sachs, the good effect of the usually sanitary home surroundings of the poor Hebrew is counterbalanced by the unusually bad sweatshop in which he works. Between the home and the work place there is another unsanitary agency, to which I will only refer in passing, and that is the very filthy and overcrowded Chicago street cars. The crux of the tuberculosis situation lies in the model housing. The Indian unhoused was healthy. The Indian housed, is passing away, from the effects of this disease. When tuberculosis first attracted the attention of the investigators of England it was thought that the cow that would be infected was the poor milch cow of the peasant who had lived an outdoor life, unsheltered, bare and scrawny. However, further observation showed that this cow was relatively free and the finely housed animal was infected.

In the lodging house district in Chicago, from 150 numbers in West Madison street, 159 cases have registered at the Consumptive Hospital in the last four years. From 20 numbers in one block on South Clark street, 138 cases have registered in that institution in the same length of time.

Closely akin to the question of housing is the matter of ventilation. I believe that no other dogma has ever been so pregnant with harm as that of the relation of drafts to catching cold. Our resistance capacity is of the same type as that of our muscle capacity. Exercise it and it grows strong; getting no exercise it atrophies. The man or woman that is always dodging a draft, who is always wrapping and coddling, who is always overanxious to keep his or her feet dry and warm, and who is always dodging a cold becomes peculiarly sensitive to colds and their sequelæ. The only safeguard against colds is through the education of the resistance to such a degree as will permit of the freest ventilation without deleterious results.

The expired air is an excretion as poisonous as is any of the secretions of the body; and who would think of using any of the excretory products. We are told that one-third of all the people die of diseases of the lungs. The reason assigned is that the lungs are one of the latest evolutionary products; that their cells come in contact with the gaseous media, whereas the normal habitat of cells is a liquid media and on top of all this there is free access to infecting bacteria. We force this delicate poised organ to work off air containing excretory products.

There are a few points upon which I wish to speak that concern your relation to the patient, and the first of these is the necessity of early diagnosis. I am sure that you are well aware of the fact that tuberculosis in its early stages is a curable disease. You are under strong obligation to both the patient and the community to make your diagnosis in the prefebrile period. I believe that in tuberculine you have an agency that is at once safe and accurate and will enable you to determine the disease in this stage. It is approximately 95 per cent. accurate and there is no other symptom or groups of symptoms that present the same degree of accuracy in this stage of consumption. The second point on which I wish to speak is the necessity of candor. Candor on the part of the physician with his patient; between the patient and his friends and between the patient and himself. No man with febrile tuberculosis has ever gotten well that did not face the situation squarely and fairly and accept it as it was. On the other hand I have known some people who have died from the misdirected kindness of those about them. Candor is necessary in order that the man shall be properly treated when treatment can be effective. It is necessary in order that the man should live in safety and in peace amongst his family, friends and the people of the community.

A very important question is where can the consumptive be treated. It is my belief that in the prefebrile stage the disease can be better treated at home than in any other locality. I believe that in our consideration of the question we can leave this group aside, what is best for them having been determined. What shall we do for the febrile case? Dr. Hurty's display would indicate

that there are about 15,000 people in Indiana who belong in this group. You can readily understand that it is not possible to transport these 15,000 people. To dump them on the West is not fair to the West, nor is it fair to the people who are sick. The majority of them will be handled, must be handled and can best be handled right here at home. Some of these, the mixed infection cases, would undoubtedly do better in the West than here, but it is exactly that group of cases that the West is not anxious to receive. I want to impress upon you the following limits to sending your patients away: Do not send a tubercular subject to the Western country unless he has sufficient funds for a proper maintenance there. Leaving aside the question of community rights it is not the best thing for your patient. By proper maintenance I mean that the man when unable to work must be able to live in the same degree of comfort there as here, and when able to work his environments must be satisfactory to him.

No one should be sent to the West who has not the proper mentality for it. If your patient is going to be homesick or melancholy, markedly depressed or equally markedly exalted, he had better remain in Indiana, and lastly, the man who is cured in the West should stay in the West. Finally the people must be cured of tuberculosis in the place where they have contracted the disease.

The subcommittee of our work is the Committee on Popular Propaganda and it is their duty to give public lectures, to issue pamphlets, to read papers before medical societies, to furnish matter for newspaper editorials and articles and to circulate magazine articles on the subject of this disease. The underlying idea of this feature of our work is: Tuberculosis is a preventable disease. For its solution no new agencies are required. No powers are demanded save those now in existence. But the needed potentialities are dormant. They can only be made manifest by an awakened public intelligence, an excited public sentiment. The good is general and in the majority of instances impersonal; the resisting influences are opposed by personal and property rights. The concentration and directness of a concrete force can be matched by the massive bulk of impersonal movements. Behind

the enactment and enforcement of written and unwritten law must stand public intelligence and behind this public conscience. The people must be told and retold.

Dr. Hurty and the State Board of Health of Indiana and the Indiana State Medical Association are making efforts to arouse public sentiment on this question. We should bring to their help all of the influences that we can. We feel deeply upon this matter. Lives are being wasted because the people do not know, or knowing have not become conscience-stricken by the enormity of the conditions. We plead for the help of each and every community.

REPORT UPON TUBERCULOSIS.

BY THEODORE POTTER, A.M., M.D., OF INDIANAPOLIS, CHAIRMAN OF THE COMMITTEE.

At the meeting of the State Medical Association held in Richmond, a committee was appointed to consider the situation and present to the association a report upon tuberculosis. This action was in recognition of the fact that a great movement is under way throughout the world having for its object the control of this dread disease, and that the time has come when Indiana should be taking her part in this philanthropic and economic crusade.

The modern crusade against tuberculosis has been most actively pushed and carried to its most advanced development in Germany; but other European countries have followed closely upon Germany's leadership. National and international congresses have been held, and have brought together many of the greatest pathologists, clinicians and sanitarians to consider and take action upon the pressing problems of the great white plague. Many of the most influential philanthropists, sociologists and statesmen have joined with the medical profession, and the nobility and crowned heads of Europe have not hesitated to lend their active encouragement and aid to the movement.

The antituberculosis crusade has actively invaded our own country and is rapidly moving from State to State. Several attempts have been made, without much success, to organize congresses for the study of tuberculosis, the diffusion of professional and popular knowledge concerning it, the awakening of a more general interest, and the stimulation of more active and systematic efforts to combat it. Of late the prospect for such intelligent and united action has become much more promising. During the past winter a tuberculosis exposition, modestly so-called, was held in the city of Baltimore, under the best professional management, and

this exposition, together with the addresses delivered in connection with it, has had a deep and widespread influence. Since then a body of men, meeting in Philadelphia, and whose names and work at once command universal confidence, has started an organization and a movement around which will in all probability rally the organized antituberculosis forces of North America.

A number of States have already organized official medical or combined medical and lay campaigns against the disease. In a number of States, and in many cities, physicians are now required to report cases of known pulmonary tuberculosis to the health boards. Several States have already established and several others are in process of establishing public institutions for the treatment of tuberculosis among the poor.

The press, recognizing the public interest, is taking an active part in the movement, and many of the leading daily papers, monthly magazines and reviews are publishing editorials or articles from the pens of recognized authorities in support of the crusade against tuberculosis. Private philanthropy is being enlisted in the cause, and American men of wealth are beginning to see in this direction a great opportunity for liberal gifts. A wealthy American manufacturer has endowed with millions the foundation which bears his name and will bear it in honor to posterity, and this Phipps Institute of Philadelphia is already well organized for the study of tuberculosis, the promulgation of knowledge and of the most efficient means of combating it. Another wealthy American business man, stimulated by the Baltimore exposition, has given liberally to the same cause.

Now all of these things mean that the world is being awakened to the significance of the modern knowledge of tuberculosis, the seriousness of tuberculosis as a social as well as a medical problem, and the possibilities of prevention and cure which are open to intelligent, earnest, united and well supported effort. And all of these things mean that it is high time for the great State of Indiana to join with her neighbor Ohio and with other States in the beneficent contest against tuberculosis whose successful outcome the twentieth century shall see recorded in letters bold and bright.

Tuberculosis is in large measure a controllable disease; toward this control the world is rapidly, imperatively, and determinedly moving, and we must now bear our part in the movement.

We must at the start recognize and set forth certain facts as a basis for intelligent thought and action. And first as to the prevalence of the disease:

"Tuberculosis is the most universal scourge of the human race. It prevails more particularly in the large cities and wherever the population is massed together. One-seventh of all deaths are due to it. In the United States Census for 1890, 102,188 deaths were reported to be due to consumption. At a low estimate one can say that at least 150,000 persons die annually in the United States of some form of tuberculosis" (Osler). "An estimation based on the census report gives the total number of persons in this country infected with tuberculosis as 1,050,000, or 1 in every 60 of the population" (Vaughan).

"Among all the infectious, epidemic, or pestilential diseases, tuberculosis is the most terrible. In the State of Ohio its victims number about 6,000 annually. It destroys more people in this country than smallpox, plague, yellow fever, diphtheria, and scarlet fever combined. During the year 1900, consumption, or tuberculosis of the lungs, caused 109,750 deaths in the United States. Its victims are largely those in the vigorous adult period of life. The deaths from consumption in 1900 were 10.9 per cent. of those from all causes." (Report of Ohio State Tuberculosis Commission.)

In our own State the facts are equally ominous. The report of the State Board of Health shows that during 1903 there died of tuberculosis in Indiana 4,392 persons. Of these 4,063 died of those forms of the disease commonly included under the term consumption. And the direct cost of these cases, not including loss from incapacity to work and from the care of the resulting dependents, was over $3,000,000.

But tuberculosis not only causes this great number of deaths; it is correspondingly pre-eminent in the immense total amount of illness due to it. Such diseases as diphtheria, scarlatina, pneumonia, variola, and even typhoid fever, last as a rule but a short time,

while the average duration of illness from fatal or serious tuberculosis is measured by months and years.

An additional seriousness of tuberculosis as a social problem grows out of the fact that it attacks chiefly those in the active middle period of life, strikes down those who are just preparing or just prepared for, or just well established in life's work, and that it therefore leaves so many orphans and other dependents behind. The report of the Ohio Tuberculosis Commission shows that of 445 orphans in nine institutions, 24½ per cent. were orphaned through tuberculosis. The statistics of our State Health Board upon these points are worthy of serious study: These statistics show that among the deaths from consumption in 1903 there were 790 mothers between 18 and 40 years of age and 425 fathers between the same ages. There were 2,515 orphans under 12, and 1,215 homes left fatherless or motherless.

With the increase in numbers, and the concentration of the population in closely associated groups, as in schools, stores, workshops, office buildings, tenement and apartment houses, factories and correctional institutions, and as a result of such concentration, the disease tends to increase.

Surely with these facts before us we must recognize in tuberculosis not merely a medical but a great social problem, to be successfully attacked only by the combined action of the profession and the public.

In addition to its recognition of tuberculosis as presenting a serious social problem, the present antituberculosis movement is based upon a recognition of the significance of the modern knowledge concerning the cause, the nature and manner of propagation of the disease.

Tuberculosis is a specific infectious disease due to certain now well known and understood germs. The history of this discovery is of intense interest to every student of medicine and is now matter of common professional knowledge. Villemin in 1866 showed tuberculosis to be an inoculable disease; Cohnheim set forth clearly its specific infectious character, and Robert Koch placed his name among the immortals of medicine by announcing

in 1882 his discovery and demonstration of the specific germs. This demonstration, declares Osler, "should be carefully studied by any one who wishes to appreciate the value of scientific methods. It forms one of the most masterly demonstrations of modern medicine. Its thoroughness appears in the fact that in the years which have elapsed since its appearance the innumerable workers on the subject have not, so far as I know, added a solitary essential fact to those presented by Koch."

Of these germs we know that they are thrown off, often in great numbers, in the material coming from the seat of disease; that they are not given off from the intact body surfaces, internal or external, nor in the expired air except as that air may contain solid particles of debris from the lesions; that these germs may retain their life and virulence for a long time, at least for months, under favorable conditions of moisture and absence of sunlight; that they do not multiply under any ordinary conditions except in the bodies of men and animals; and that they may produce the disease in both human beings and in a number of the domestic and semidomestic animals. We know, too, now beyond any question, that without the growth of these germs in the body the disease does not exist.

Of the disease tuberculosis we know that it is seldom transmitted by heredity, but that its long supposed heredity and the fact of its prevalence in families are to be explained chiefly by infection resulting from close association. We know also that the healthy human body, especially after the period of maturity is reached, does not offer favorable conditions for the development of the disease, and that, therefore, predisposing factors hereditary or acquired, chiefly the latter, play a very important role in the implantation of the germs and the development of tuberculosis in the individual. We know, too, that for the disease in an advanced stage there is, at present, no specific and no great hope of cure; but we also know that for a large proportion of those in whom the disease is detected early, as it may now usually be detected, there is, under the more favorable conditions which the modern antituberculosis movement seeks to bring about, a good hope of a successful contest with it.

As to the much discussed and serious question of the relation of bovine to human tuberculosis, and the danger of infection from cattle to men, the recent negative announcements of Koch have reopened the question. But it must be said that most experimenters and authorities adhere to the older view and insist upon the possibility and probable frequency of the transfer of tuberculosis from cattle to human beings.

The present antituberculosis movement has as its chief object the prevention of tuberculosis and as its chief basis the increased possibilities of prevention growing out of the modern knowledge of the disease carried into effect upon the principles of co-operative action. These possibilities of prevention lie in two directions: the control of infection, and the control of some of the most important predisposing factors.

An enumeration of the factors predisposing to tuberculosis would include an enumeration of most other diseases with special emphasis upon certain of them, and likewise of all those things included under the term bad hygiene which tend to weaken the body and undermine its resisting powers. But as an abundance of pure air is the best protection to and the best medicine for the lungs and the blood, and an abundance of nourishing food the best agent for building up and maintaining the integrity of the tissues, our chief efforts in the direction of controlling the predisposing factors must be along these lines, especially the former. We must insist upon the importance of abundance of pure air and the out-door life, especially during the developmental period of life and the earlier years of maturity. And we must insist, as population grows and concentration of men indoors increases, upon the growing importance of close and official supervision of the sanitation of places where people do thus congregate. This means first of all the sanitation of the homes of the people with special emphasis upon cleanliness and ventilation. And next it means more strict supervision with reference to these two things of such places as schools, public buildings, public conveyances, correctional institutions, factories and workshops, and places of public assemblage. School boards must be impressed, as indeed they are now being more and more

impressed, with the importance of the hygiene of school buildings as well as of efficient business and educational conduct. And the importance of the health of those whom they are instrumental in bringing together and confining in limited spaces, must be more and more impressed; officially if necessary, upon the owners of factories, workshops, and places of public assemblage.

Tuberculosis, especially in the larger communities, is becoming more and more distinctly a disease of the poor, the ignorant and the careless, and close investigation now traces this fact chiefly to defective sanitation in the home, aided by defective sanitation in places of indoor work. As to the control of the material agent of infection, modern knowledge clearly points out and loudly calls for increased vigilance along this line. With proper care against exaggeration and misunderstanding of the facts, we must keep constantly before our own minds as physicians the fact and must proclaim to the public the doctrine that tuberculosis is an infectious disease and in large measure a preventable infection.

Though the exact manner of infection be often or usually obscure, especially in individual cases, owing to the insidious, slowly developing, and often latent course of the disease, we can no longer hide from ourselves nor allow the public to remain in ignorance and unappreciation of the fact that the disease though invited and aided by many predisposing factors, comes primarily by infection.

We must, therefore, do everything practicable to insure the safeguarding and destruction of the extruded germs of tuberculosis.

To this end three propositions should be emphasized and clearly set forth for our own and the public guidance:

First. We should, as far as possible, keep control over tuberculous excreta by insuring its deposit in definite receptacles. Ordinary cleanliness as well as safety demands the enforcement of this rule.

Second. All such material should be kept from drying, to insure against its dissemination through the air, especially indoors, under conditions favoring its inhalation and ingestion.

Third. All such material should before final disposal, be de-

prived of its infectious property by efficient exposure to chemical disinfectants or to heat, or both.

But while insisting upon the necessity of these things, and thus emphasizing the danger of infection, we may and should clearly assure the public that the body and the breath of tuberculous persons are not dangerous, that the germs are only in the excreta, and that if the proper and simple precautions be observed by the patient and his associates, even close domestic association with a consumptive need not involve anxiety. So true is this comforting assurance that we may point to the tuberculosis sanitoria as places of safety for the well. Trudeau, of the Adirondack Cottage Sanitarium, has stated that in nineteen years' experience in that institution no nurse or employe had ever contracted the disease there.

In order that preventive measures may be devised and carried out most efficiently, the public sanitary authorities should have knowledge of the places and circumstances of the existence of the disease, at least in its forms most dangerous to the public health. The time, therefore, we believe has come when all cases of known pulmonary tuberculosis should be reported to the boards of health.

There has been much discussion, and in the past much difference of opinion, as to this proposition. But careful and broad-minded investigation, a clear view of the situation and the problems involved, together with the evolution of sanitary science and administration, are making more clear the wisdom and necessity of this advance. Already it has been adopted in many progressive communities, including the capital city of our State, and the near future will doubtless see its adoption made general. But its purpose and intent should not be misunderstood. It is plainly neither necessary nor expedient nor practicable nor humane to enforce upon tuberculous individuals and households the same restrictive measures as are enforced in the case of other communicable diseases such as scarlatina and variola. But there are instances and circumstances in which the public authorities should exercise their power in isolating helpless, ignorant or indifferent individuals, or in giving advice, command or assistance toward the carryng out of preventive measures, including the disinfection of infected houses.

The first step in the successful contest against any evil is to know the fact, the nature, the location and the circumstances of its existence. Only through this knowledge can the boards of health be given the opportunity to devise and carry out such preventive measures as wisdom and experience may indicate for the public good and the interest and welfare of certain classes of the afflicted. As a part also of this work in the crusade against tuberculosis, the establishment of municipal and state laboratories, under the supervision of boards of health, will assume more importance, and the necessity and demand for them, professional and popular, will be more and more felt and asserted.

Second only in importance to its purpose of emphasizing and carrying into effect more successful preventive measures, the modern antituberculosis movement seeks to realize upon the better possibilities of treatment which the knowledge of today opens up.

The first effect upon therapeutics of the discoveries of Koch, was naturally to stimulate efforts to find an agent which would destroy or stop the growth of the germs in the body. Thus far this search has been fruitless, and its failure constitutes one of the keenest disappointments of modern medicine.

A second result, growing out of the failure of the first, has been a renewed study, with practical ends in view, of the predisposing factors, the natural process of cure, and the possibilities of success by following the indirect attack upon the disease process. In brief, by directing our efforts chiefly toward the soil rather than the seed.

A study of the history of medicine shows that from time immemorial this has been the most successful method of treatment of pulmonary tuberculosis. And this method has found its chief expression in what is commonly known as climatic treatement. From time immemorial a climatic change, particularly a residence in certain special climates or regions, has been held to afford the greatest hope of cure. And this remains true today.

That there are special virtues in certain climatic and geographical conditions in the treatment of tuberculosis, can hardly be denied in the face of vast experience and of modern physiological study. There are recognizable beneficial physiological effects in

many cases of tuberculosis and other diseases, resulting from variations in air rarification and pressure accompanying altitude, in purity of the air, in dryness, and in the chemical effects of the sunlight in certain regions. And we do well to bear this in mind in view of some exaggerated statements which are at times made to the contrary. Nevertheless a close review of the whole subject of climatotherapy by modern clinicians reveals the fact that the chief elements of benefit in a climatic change for tuberculous persons are those which conduce to and favor the outdoor open-air life. And this has led to the further conclusion, enforced now by wide experience, that the larger part of the benefit of so-called climatic treatment may be obtained in any reasonably healthy region, provided the open-air life be adopted. And if to this open-air life there be added abundant nourishment, skilful medical care, and careful regulation of the daily life-conduct of the patient, the advantages of a specially favorable climate without these things will be more than counterbalanced. And this is the most encouraging and cheering therapeutic revelation of the tuberculosis movement of today.

Fresh air, sunlight, high nutrition, control of the daily life of the patient, together with rational medical treatment; these things in efficient combination make up the best and the increasingly successful management of nonsurgical tuberculosis.

It is the increasing experience with this combination of agencies, demonstrating its efficiency and its practicability as compared with ordinary methods or with a climatic change under the ordinary conditions, which has given rise to the modern institutional treatment of pulmonary tuberculosis. Such a plan of treatment can, in most cases, evidently be best carried out in a sanatorium devoted to the purpose. And for most of the sick poor and those in moderate circumstances, these sanatoria are best and most practicably located near the homes of those for whom they are to be provided. Out of this conviction has grown the movement, now rapidly spreading over the world, for the establishment of municipal and State as well as private sanatoria. The results of the treatment in such sanatoria are now well known and need not be quoted statistically here. They surpass, by general consent, those obtained by any known method.

The purpose of these public institutions is both therapeutic and educational. In a large per cent. of the cases brought under treatment reasonably early the disease may be arrested and the patient again put upon his feet. But more than this, he is sent out an enthusiastic and trained missionary of the fresh-air doctrines and of the necessity and methods of preventing the spread of infection. They serve another purpose in that, by removing from the homes, especially of the poor, the source of infection, and that during the period of danger, they lessen the spread of the disease. Thus they serve the triple purpose of prophylaxis, education, and efficient treatment.

The State provides for the care and treatment of the insane, the deaf and dumb, the blind, and the feeble-minded, who might be a burden and a danger to the community; and it does this both as a public charity, as a protection and as an economy to itself. It should do the same for the tuberculous poor. Aside from the alleviation of his distress, it is cheaper for the State to educate the deaf and dumb or the blind man, and to restore him to usefulness and self-support, than to lose his earning capacity and leave him a public burden. This also is true of the curable consumptive. As concerns our own State it may be shown that we are now paying for the mere care until death in our scattered infirmaries and other public institutions, not to speak of the expenditures in private charity, sufficient to maintain a large sanatorium which would restore to usefulness a large proportion of its inmates. And what is thus true of Indiana is true of other States.

Recognizing these facts as to the therapeutic, prophylactic, educational, and economic value of such public sanatoria, a number of States have already entered upon this work and are annually extending it as experience proves to them its wisdom. Among the States in which this movement has already been carried to completion or is under way are, Massachusetts, Maine, Rhode Island, New Hampshire, New York, New Jersey, Pennsylvania, Michigan, Illinois and Minnesota. Several provinces of Canada have done or are doing the same. The last Ohio legislature definitely entered upon the work by making a liberal appropriation for the establish-

ment of a State sanatorium, the Ohio Tuberculosis Commission, appointed by the Governor and including a majority of laymen, having "unanimously recommended the establishment by the State, as early as practicable, of a sanatorium for the treatment of incipient cases of tuberculosis, and that the General Assembly appropriate at its next session the sum of $200,000 for the purchase of a site and the erection of suitable buildings properly equipped." The commission further reported that "the State of Ohio, in advance of almost all the other States of the Union in the establishment of institutions for the care of its unfortunate afflicted, should not hesitate to provide for the care of its consumptives by the establishment of sanatoria."

We, too, take a just pride in the advanced position of our State in the care of its unfortunate afflicted, and in the beneficent work and manner of conduct of our public charities. Surely we can not long lag behind our neighboring State of Ohio in this philanthropy, nor close our eyes to the significance and to the social and professional demands of the great world-movement against the arch-enemy tuberculosis.

Your committee would therefore recommend the adoption, by the Indiana State Medical Association, of the following resolutions:

1. That we recognize in tuberculosis a great social as well as a medical problem.

2. That we recognize in the modern antituberculosis crusade a world-movement in which we should be taking our part.

3. That we recognize in tuberculosis an infectious disease, seldom if ever actually transmitted by heredity; and therefore a disease in large measure preventable.

4. That in the interest of the public health cases of known pulmonary tuberculosis should be reported to the boards of health.

5. That in furtherance of the most successful contest against tuberculosis as well as against other infectious diseases and unsanitary agencies, the establishment and efficient maintenance of municipal and State laboratories is a matter of public economy and necessity.

6. That we endorse and will support judiciously combined and conducted professional and popular propaganda against tuberculosis.

7. That the State of Indiana should promptly proceed to the establishment of a public sanatorium for the treatment of tuberculosis; and that

8. These resolutions, and especially the 7th one, be, and they are hereby ordered to be, presented by the Committee on Legislation to the next State Legislature with a request for definite action upon the same.

Respectfully submitted,

THEODORE POTTER,
J. N. HURTY,
J. F. BARNHILL,
GEO. T. McCOY,
HUGH COWING,
L. P. DRAYER.

SOME PHASES OF TUBERCULOSIS.

BY B. VAN SWERINGEN, M.D., OF FORT WAYNE.

The phase of this subject which interests the general public most is the question of prevention; that is, it should interest the general public most. The fact is, however, that, with the exception of a very few laymen, those who have no cause to investigate the subject, including many who practice some branch of the healing art, are entirely ignorant of the prevalence of this scourge or of the necessity of concerted action toward its prevention. It very naturally devolves upon the medical profession to educate the public upon the necessity for measures looking to the prevention of the spread of this disease, and, in so far as may be, providing means for its cure.

The importance of the subject must be my excuse for bringing the subject up in this incomplete manner.

Naegeli, from a study of his post-mortem findings, announced some time ago that most all corpses of people who had attained the age of 30 years or over presented evidences of tuberculosis in some part, and von Behring, in a late publication, says that the tubercle bacillus is ubiquitous and enters every child's system during the first ten weeks of life. These opinions agree with Schroeder's well-known declaration that "Teder man hat am ende ein bischen tuberculose."

The statement of von Behring, that infants contract the disease—or rather the bacillus—early in life brings up the question of the mode of infection, and he advances the old view (Baumgarten's) which has recently gained new adherents based on experimental evidence that infection occurs by means of food.

There are some things about the germ which are hard to reconcile with the inhalation theory of infection. In the first place it is held by some that all bacterial life is strained out of the air during

its passage through the upper respiratory tract. Jonathan Wright (N. Y. Med. Jour., April 2, '04) says: "To assume the entrance of the bacillus in the air current into a pulmonary air vesicle, we must somehow get rid of the law of gravitation, or we must believe that the bacillus is of the same specific gravity as air, or that it is itself a gas and subject to the law of the diffusion of gases."

Then again it is shown by autopsies that infection by the tubercle bacillus generally occurs through the upper respiratory passages. Infected food would support this view as well as infected air.

If it can be proved that Behring's contention is correct in regard to the ubiquity of the germ we might as well cease our attacks upon the bacillus and turn our attention to other more promising fields of prevention, particularly the question of raising the individual immunity to the disease. Behring, with this idea in view, advocates "feeding nursing infants on antibodies in the milk of cows rendered immune to tuberculosis, the infants taking their nourishment in the usual way and being carried over the period most exposed to the danger of tuberculosis infection." He leaves it undecided whether the idea is practicable or not.

Until these questions are more definitely settled we should continue our endeavors as heretofore, for they have not been without effect upon the statistical tables, especially in New York City. Antispitting ordinances, factory inspection, disinfection of apartments after death from tuberculosis, and compulsory notification do good—if in no other way, by keeping the subject before the lay mind, thus educating them upon the disease and by correcting bad hygienic conditions.

Practical experience in the treatment of tuberculosis of the lungs by hygienic and dietetic methods seems to show that improvement follows a treatment which provides pure air night and day. One can not ignore the numerous observations which have led to the view expressed by so many that pulmonary tuberculosis is a "house disease." The great prevalence of this disease in the tenement districts of New York City seems to bear out the statement. I think it was Whittaker who said that no one ever contracted tuberculosis out of doors.

It is not necessary at this time to do more than mention the various modes of attack upon this disease except the question of sanitaria, which should be emphasized as a very important means of preventing the spread of this scourge and of curing those already ill of it; for no matter what view we take of the mode of infection, we must be governed by the "brute force of the figures," which show a reduction in the death rate as a result of the crusade against it carried on on the basis of belief in the inhalation theory.

These sanatoria should be State institutions, conducted much as are the State's other benevolences. Some States have already provided them for those of their citizens too poor to pay for treatment at other more fastidious sanatoria, and a bill is now pending in Ohio to provide for their establishment in that State.

Indiana should have them by all means. The arguments for them are that they prevent the spread of the disease by teaching the patient the proper disposition of the sputum and removing him from the proximity of others as prone to contract tuberculosis as they were; that they can be taken care of in institutions at a less expense to the people than they can be in poorhouses and by outdoor township relief; that many of them may be cured and returned to their families, capable of supporting them, whereas at present they nearly all die; that the movement is humanitarian and therefore elevating.

When one thinks of all the many ways that the bacilli of this disease may be scattered about by the careless and ignorant subjects of it, it seems an almost hopeless task to prevent the spread of the disease by education in regard to the proper disposition of the sputum, and yet the efforts that have already been made have been productive of good and give promise of further good results along this line in the future. Compulsory notification should be universally practiced. It is not intended to make the patient's lot any harder than it already is by including this disease among the infectious diseases. The intention is merely to locate infected houses that they may be properly disinfected, to teach the patient what his disease is and how contagion may be prevented, and educate him on the means of cure. Much discretion may be given the health

officer as to the necessity for these measures. Some cases will need strict supervision and others hardly any, depending on education and tractableness.

Another phase of the subject of tuberculosis of paramount importance to the physician is the question of diagnosis. There are many cases that offer no particular difficulty in recognition. There are others that present extreme difficulty, especially the beginning of chronic ulcerative phthisis. The advanced disease is often recognizable by mere inspection of the bare chest. It is the onset that is hard to discover. One has to be constantly on the alert lest he regard a cough as the result of a bronchitis from influenza instead of the onset of chronic ulcerative phthisis, because at the time he is asked to make a diagnosis there are usually no other signs present than moist rales on both sides. Tuberculosis may be at the bottom of a case in which fatigue and anaemia are the only symptoms; no symptoms referable to the lungs being complained of or discoverable. Progressive loss of weight with simple anorexia is always suspicious of pulmonary tuberculosis, whether accompanied by cough or not. Then, also, chronic hoarseness is suspicious, for tracheitis and laryngitis may be the first lesions.

The mode of onset that has misled me most frequently has been that in which dyspeptic symptoms constituted the main complaint, so that I now view with great suspicion every one who comes complaining of intractable indigestion. It is not meant that tuberculosis is always found in these cases, but that it is so frequently found that examination of the chest should always be made in stomach cases. Nor should one rest content with a single examination, but it should be repeated again and again until recovery proves the suspicion groundless. Among the means employed to discover the presence of this affection the most reliance continues to be placed on physical signs even in the early cases. All physicians recognize the fact that there is a time at the beginning of chronic ulcerative phthisis when the lesion is not large enough to produce changes discoverable by such crude examination as is the most careful and thorough physical examination of the chest. Then the personal equation enters largely and the degree of mental concentration em-

ployed, for even a very good diagnostician may occasionally go wrong. Some men never acquire the ability to distinguish early cases of pulmonary disease.

As helps to the early recognition of these cases may be mentioned tuberculin and the fluoroscopic examination. The serum reaction of Arloing and Courmont has not been successful, for responses are met with in healthy individuals and then cases of advanced tuberculosis do not at times respond, so that as a diagnostic agent it is not used. Blood examination gives very little help in the recognition of early pulmonary tuberculosis, for at a time when it is desirable to make the diagnosis there is, in uncomplicated cases, very little reduction in haemaglobin or erythrocytes or increase in leucocytes. A leucocytosis in these cases denotes cavity formation and secondary infection if it does not follow hemorrhage or the onset of peritubercular bronchopneumonia.

Tuberculin has always proved very satisfactory in my hands except in one case, and that quite recently. I have seen statements by others to the effect that the reaction did not always occur in some instances, but could not credit it. I am familiar with the fact that after a varying number of injections of tuberculin the reaction fails to appear as it does when first employed. But in the case just referred to the physical signs of consolidation at the apices were quite well marked and the fluoroscope showed shading over both apices. Tuberculin was used in a routine way to clinch the diagnosis in the dose of 5 milligrams. No reaction occurred, no chill or aching, rise in temperature, or local signs.

In another case under the care of Dr. C. R. Dancer and Dr. Garrette Van Sweringen, of the I. S. F. M. Y., signs of consolidation led to the use of tuberculin (.0075 mg.) and no reaction followed. The bacilli were subsequently found in the sputum.

I have had no opportunity as yet to confirm the diagnosis in my case, but feel so sure about it that I report it as a case of tuberculosis which did not respond to tuberculin.

As an aid to conclusion I can also recommend the fluoroscope. One has to be familiar with it and know how much of weight to place on its disclosures, but I may say that even in very early cases it offers valuable aid in many cases, either positively or negatively.

TUBERCULOSIS.*

BY WM. A. M'COY, M.D., OF MADISON.

Time will not permit an exhaustive paper on this subject, as it is a long story, and I want my esteemed second, Dr. Ryker, and the rest of you to have a chance at it. I shall confine what I may have to say to pulmonary tuberculosis, and shall attempt to touch only a few of the high places, omitting details. Tuberculosis is infectious, either acute or chronic, but usually chronic; more often attacking the lungs, for the reason no doubt, that this is the most convenient avenue into the system. It may, however, enter by any avenue by which the tubercle can gain access to the circulation. It may be safely claimed that it is the most universal disease known; no season, time place, age or sex, being exempt from it, and it has a longer death roll than any other disease; some observers claiming for it a greater mortality than all other communicable diseases combined.

Etiology: Heredity.—It is claimed by some capable observers that heredity is never responsible for it. Perhaps that is true. But to this I can not consent. When you prove to me that insanity, scrofula, cancer, goiter, epilepsy, gout, kleptomania and other diseases are not transmissible, then I may be persuaded that tuberculosis is not hereditary. At any rate it is difficult to prove it either true or untrue; but one thing is undoubtedly true: the children of tuberculous parents are more prone to contract the disease than are the children of nontuberculous parents under the same conditions; due no doubt to feeble resistance.

Clinical Features.—This is one of the most insidious diseases with which we have to contend; the pulmonary symptoms being often preceded by a period of weeks or months, by a subnormal

*The author of this paper died a few days before the State Society met. The paper was ordered published in General Session.—Editor.

condition of health, indicated by increasing debility, anemia and loss of weight. Perhaps one of the first symptoms to direct attention to the lungs will be a slight bronchial cough, at first so trifling as to receive little or no attention. But whether trifling or severe, cough will most likely be one of the first symptoms to attract notice. Or perhaps an attack of hemoptysis, after a longer or shorter period of doubtful health, will be the first symptom to attract attention, as it is quite unusual to see a case run its course without more or less hemmorhage at some stage.

Pain is common, but not always present. It is usually sharp and lancinating, being closely localized. It may be due to involvement of a more or less extensive patch of pleura, to intercostal neuralgia, or to pressure on a nerve by a patch of hardened or sclerosed lung tissue.

Acceleration of pulse is an early and fairly constant symptom. Great frequency of pulse is always indicative of activity of disease. There is more or less temperature. It is an important symptom at all stages of the disease, and a lack of it is sufficient cause to call in question the accuracy of the diagnosis. In the typical case of consumption the temperature will not vary greatly from 100 degrees in the morning, to 103 or 105 degrees in the evening. Respiration is increased in frequency. Usually the increase is in proportion to the severity of the disease.

Chills and sweatings are likely to be present, and are liable to be mistaken for malaria; especially will this be true if the district be malarial. The menstrual function is liable to be deranged, or entirely suppressed. Digestive symptoms are usually prominent, manifesting themselves by loss of appetite and diarrhœa; diarrhœa will be prominent if the bowels are involved.

Of the physical signs, respiratory changes are to be especially noted. The inspiratory act is shortened, while the expiratory act is lengthened, or relatively lengthened, when compared with the healthy respiratory act. In normal respiration, the inspiratory act occupies about three-fourths of the cycle, and expiration about one-fourth; while in the consumptive, expiration is prolonged to be equal to or longer than inspiration. The so-called cog-wheel res-

piration is not to be much regarded as a diagnostic sign, as we have it in other and entirely different conditions. Vocal resonance is exaggerated, while percussion resonance is diminished. Vocal fremitus is exaggerated, owing to, and in proportion to the degree and extent of consolidation of the lung. Consolidation also causes bronchial breathing.

Treatment.—Early in the case our efforts must be directed to improving our patient's nutrition and general condition. See to it, if he can be kept under observation, that he does nothing that will disturb his appetite, whether it be in the use of drugs or surroundings. For this reason so-called expectorants and cough remedies are to be used sparingly. His surroundings are to be free from dust, and his time spent out of doors as much as possible. By this I do not mean that all are to be put on the so-called outdoor treatment, as that is clearly out of the question in very many cases, but if possible, give him some outdoor occupation suited to his strength and condition in life. Let him take all the exercise possible, short of fatigue; that is to be avoided at all times. Exercise has the double purpose of toughening the body, and promoting appetite, which is all-important, as failure of appetite and assimilation of food means progression of disease, and ofttimes we encounter right here the most constant and troublesome symptom with which we have to contend. As the disease advances and debility increases, it becomes necessary to reduce the exercise to a minimum, or stopped entirely, as such strength as exists must be carefully conserved.

The matter of diet is one of the most important parts in the management of the tuberculous patient; the object being to get as much animal food, including fat, into the system as can be assimilated, avoiding predigested foods as long as possible. A good cook is a very important personage to have around at such time; poor cooking and a capricious appetite makes a bad combination. A hearty diet, consisting of tender meats, eggs, milk, cream and butter, is to be given, avoiding as much as practicable, starch and sugar, as they cause fermentation. Later in the case it may be necessary to modify the above list, and instead give some of the predigested, or artificial foods, meat extracts, etc.

When we take a survey of the treatment of phthisis as recommended today, it almost makes us dizzy, the drugs and practice are so limitless. As before stated, our chief aim should be the nutrition of the patient; with this thought ever in mind, our treatment must be along those lines. Iron is one of the essentials, to combat the anemia that is ever present; but we must not forget that it often deranges the appetite and constipates the bowels. Arsenic, too is an agent that we should not lose sight of as a restorative, and especially if there is marked anemia. Strychnine is not as much used as it deserves to be. It is one of our very best bitter tonics and stomachics, increasing appetite and digestion. It is the best of all respiratory tonics, especially where permanency of action is most essential, and in order to obtain the best results it should be pushed well up to toleration. It is astonishing what large doses many patients will bear.

Perhaps today no drug has more friends in lung trouble than creasote, or its near relative, guaiacol; but, unfortunately, the stomach often refuses to tolerate them in sufficient doses to be of much avail. In that case it may be exhibited by the nebulizer with happy effect, especially where there is much bronchial irritation. Cod-liver oil is a drug of much merit, but it, too, has its limitations. It no doubt has medicinal properties that are unknown in any other single drug. It is, indeed a "medicine," but is so easily adulterated, and decomposes so readily, that it is difficult to get the desired results without deranging the stomach. Its effect is most marked if exhibited in the early tuberculous state, or in the substandard periods that precedes, for a shorter or longer time, the outbreak.

Cough.—It is well to use cough remedies cautiously, as they usually upset the stomach; but if the cough be very distressing, it is better to try and control it measurably, even if digestion does suffer thereby. Among the legion of drugs that have been recommended for cough, probably heroin, introduced within the past two or three years, will afford us as much or more comfort than any other drug now in use. For the so-called throat cough, an oily spray of camphomenthol and eucalyptol will give relief.

A dozen or so years ago, tuberculin was discovered and sent abroad labeled a "specific," but of recent years we are hearing but little of it. Amenorrhea does not require special medication usually, as it is dependent upon the general condition of the system; but we frequently have trouble in convincing our patient and her friends that the menstrual derangement is not at the bottom of and responsible for all her ills. The prognosis of pulmonary tuberculosis is attended with much uncertainty, although I am fully persuaded more patients are now recovering from it than was the case a few decades ago. If seen reasonably early, and we can control our patient's habits and environment, we may give a cautiously favorable prognosis, but it must be cautious.

Finally do not fail to remember that hard and fast rules have no place in this disease, but that each case must be treated individually.

TUBERCULAR LARYNGITIS.

A PLEA FOR EARLY RECOGNITION AND TREATMENT.

BY L. C. CLINE, M.D., OF INDIANAPOLIS.

Of all laryngeal affections, tuberculosis is one of the most common, tending in a high degree to fatal results; it may occur as a primary disease, but it is usually secondary and comes as a complication of the same disease in the pulmonary or other organs. The time allotted will not permit a detailed account of all the manifestations of this dreaded disease. I therefore can only point to some of the more salient features as they have been studied and observed in my own experience.

Some of our authors and writers claim that there is no such thing as primary tuberculosis, but regard the laryngeal involvement as supplementary to the pulmonary diseases in every instance. The great number of cases that have been studied and reported in recent literature are convincing that it does occur as a primary lesion and is quite acceptable from a pathological standpoint. Primary infection may, and doubtless does, occur through the lymph channels from the pharyngeal, faucial or lingual tonsils, or some portion of the upper air or digestive tract. A simple chronic catarrh of the upper respiratory tract, associated with long continued depression of vitality, become a potent factor for tubercular invasion of the larynx. No part of the upper respiratory tract is immune from the tubercular invasion, but certain parts are more liable than others. These in the order of their frequency are the larynx, pharynx, trachea, tongue and nose. We find tuberculosis of the larynx developing in three distinct stages:

First. The premonitory or pretubercular stage.

Second. The stage of infiltration or thickening.

Third. The stage of ulceration.

The first or premonitory stage—if there is such, and most writers concede there is such a stage—is the one in which we find the most difficulty in making a diagnosis. Many catarrhal inflammations have a close resemblance to the first invasion of tubercle on the mucous surface, and it is difficult to determine whether they are cause or effect. Local pallor is usually pointed to as one of the first symptoms; while this is true in lung involvement it does not always hold true in primary laryngeal infection. The diagnosis of primary laryngeal tuberculosis is facilitated by obtaining an accurate history of the case; by the symptoms as related by the patient; by the accurate and regular use of the clinical thermometer; by carefully noting the conditions and changes in the larynx as revealed by the laryngoscope, and by the presence in the sputum or scrapings of the tubercle bacilli. The abscence of the tubercle bacilli from the sputum or scrapings taken from the larynx should not be taken as conclusive evidence that the disease does not exist. The patient will complain of a dryness of the throat, with some difficulty in swallowing. The dysphagia in advanced cases is the most distressing of all the symptoms. The victim would rather starve than undergo the agony caused by the act of swallowing. Impairment of the voice is one of the first symptoms to call attention to the larynx. Hoarseness to complete aphonia will prevail, depending on the situation and character of the lesion. The voice is croupy or brassy, according to the extent of the invasion of these structures. At first there is only mucus expectorated, which later becomes mucopurulent. Slight hemorrhages may occur from capillary erosions. The constitutional symptoms are general malaise, weakness, loss of weight, slight elevation of temperature in the afternoon with subnormal temperature in the early morning. The symptoms and structural changes will be further noticed in connection with the secondary invasion. In Grayson's new book we find this statement: "The frequency of secondary invasion of the larynx has been demonstrated by Heinze, who, in autopsies of 1,226 cases dying of pulmonary phthisis, found that the larynx presented unmistakable

evidence of the disease in 51.3 per cent." Other writers give from 20 to 40 per cent. It is altogether probable that, while the disease attacks the larynx subsequent to pulmonary involvement, the bacilli reaches the laryngeal tissues through some abrasion of the epithelium.

Chronic catarrhal laryngitis, with general impaired vitality, furnishes the most favorable conditions for tubercular infection. The male being more subject to catarrh, it is in this sex the greater number of cases occur, the proportion between the two sexes being about three to two. In the secondary cases there is a period of anemia of the laryngeal mucous membranes that precedes the stage of infiltration and tumefaction that are generally recognized as the first evidence of tuberculous deposit. The commissure, or interarytenoid space, on account of its loose cellular tissue and glandular structure and on account of the sputum collecting and clinging to this region before being expectorated, is the favorite point of infection. The next point most frequently attacked is the apex of one or both arytenoid eminences. The pyriform swelling of the arytenoid, often involving the aryepiglottic fold, may be considered almost pathognomonic. The swelling may become so great at times as to hide the vocal bands. Paresis of one or both cords may occur during the stage hyperemia.

The epiglottis and the ventricular bands are the next parts most frequently attacked, being almost equal in their frequency. Perichondritis with great tumefaction may follow infiltration of the mucous covering of the epiglottis. Tuberculous ulcers in the larynx are at first small, shallow, often occur in clusters, but soon coalesce. Their edges are ragged, uneven, "worm-eaten," and are slightly elevated above the surrounding tissue. Extensive infiltration of the perichondrium may cause necrosis of the cartilages, particularly the arytenoids, and the crycoid. Recurring and persisting hyperemia, infiltration and tumefaction are the marked signs of laryngeal tuberculosis. These symptoms should receive careful attention, especially where pulmonary tuberculosis already exists. These symptoms may be present without being tu-

bercular, even in a tubercular patient. Lithemia, colds, rheumatism and voice strain will produce hyperemia and thickening of the laryngeal mucous membranes, which may recur at intervals for years. The vocal cords and ventricular bands are occasionally attacked, especially in cases where they are put to hard usage and overwork. The epiglottis may escape infection, but when it is attacked it comes late and is always preceded by pulmonary involvement.

The arytenoid and crycord cartillages are not infrequently the seat of necrosis, on account of the extensive infiltration of their perichrondrium. When the cartilages become necrotic there is a peculiar odor which is of some diagnostic value. Many cases that are found in the second and third stage require but a brief investigation by one who is accustomed to the use of the laryngoscope to make a correct diagnosis. The primary and first or incipient stages of secondary invasion may require days or weeks of careful observation to determine a diagnosis.

The family history, coupled with a pulmonary lesion, together with all the phenomena that usually follow, leave but little doubt as to the laryngeal lesion. In other cases there will be no collateral or corroborative evidence to aid us and we have to judge from the appearance and changes found in the larynx itself. The diseases that are most likely to be confounded and must be eliminated are chronic catarrhal granulomata, syphilis and carcinoma of the larynx.

Catarrhal invasion of the larynx is almost invariably secondary and is a result of extension from above. Mouth-breathing, the excessive use of alcohol and tobacco, overtaxing and abuse of the voice are all conditions that a careful observer will quickly take into account. The congestion of the mucous membrane is usually more marked in certain parts than in others. The aryepiglottic folds and the ventricular bands are about equally affected; the cords may vary in appearance from a slight redness to the fully developed singer's nodules.

Syphilitic ulcers may occur in the same locations as tubercular ulcers, and at first it may be difficult to distinguish them either by

their appearance or microscopically. As a rule the syphilitic ulcer is large, although it may be small early in the secondary stage. It appears soon after the first laryngeal symptoms and spreads rapidly. After a few days of hoarseness, examination may reveal a large ulcer. In tuberculous ulceration there is a protracted history of hoarseness and pain running a chronic course. Pain on swallowing is an important diagnostic symptom. On the contrary, a large syphilitic ulcer may be present with scarcely any pain or impairment of the general health. Other evidences of the disease are usually found. In the superficial ulcers of syphilis we find a yellow purulent discharge, a slightly rounded excavation, the surrounding mucous membrane is red but not swollen. In the tubercular process the ulcer is covered with gray mucus, there is no excavation, and the surrounding mucous membrane is pale, anemic, and has a marked swollen appearance. In the deep syphilitic ulcer we have all the features of the superficial exaggerated; the surrounding tissue markedly injected; the ulcer giving off not only pus, but necrotic tissue. Where doubt exists a few days' administration of the iodides will enable us to reach a positive diagnosis. We should not lose sight of the fact that tuberculosis and syphilis may co-exist.

Carcinoma attracts attention long before ulceration takes place; it is characterized by lancinating pain from its inception. The swelling is unilateral, with irregular nodular outline, its mucous covering highly injected. After ulceration has taken place there is a profuse secretion of an ill-smelling muco-pus, frequently containing blood and necrotic tissue. Laryngeal stenosis is characteristic of malignant disease, while it rarely occurs in tuberculosis. Notwithstanding these and many other minor differences that might be pointed out, the diagnosis is often difficult even for the expert, especially in the incipient and very early manifestations.

When tubercular laryngitis develops as a complication of pulmonary lesions it adds greatly to the gravity of the unfavorable prognosis. When the disease develops primarily in the larynx, and is early recognized and treated, the prognosis is much more favorable. Quoting from Bosworth, "The average duration of life

in pulmonary phthisis is three years; the average duration of life in pulmonary phthisis complicated by laryngeal disease is two years; the average duration of life after the supervention of laryngeal complications is eighteen months."

The prognosis may be materially influenced by certain local manifestations in the larynx. Some parts when involved are subjected to constant irritation and pressure during the act of swallowing, viz., the epiglottis commissure and arytenoids. The patient's inability to take food, the lowered vitality and the irritation facilitates the spread of the disease. If the more protected parts are involved, as the ventricular bands, the local lesions develop more slowly.

Too much stress can not be placed upon the early recognition of tuberculous invasion of the larynx, for it is in the early stages, whether primary or secondary, that we must make our fight; before the disease has sapped and robbed the patient of his vital and reconstructive forces. Any persistent laryngitis attended with violent paroxysmal cough should be carefully watched. A little dry cough occurring just before speaking should be looked upon with suspicion. In some cases speech is affected without cough. A sensation of a lump in the throat, with no apparent lesion visible, is a form that occurs particularly in women. An early gray color of the lower pharyngeal and laryngeal mucosa should be watched with anxiety. The lesion that is most frequently observed first is the pyramidal projection in the commissure of the arytenoids and the infiltrated club-shaped appearance of one or both of the aryepiglottic folds. The microscope will often—but not always—aid in the diagnosis; its value is much greater in the later stages. With our present knowledge of the disease and the improved methods of treatment, especially in the early stages, we can give a much more favorable prognosis, as compared with a few years ago. I believe that a great deal can be done for these cases if we give the necessary thought and time to each individual case and not class them all in one group to receive the same line of treatment. The treatment may, for convenience, be divided into hygienic, medicinal, surgical and climatic. Under hygienic meas-

ures, certain rules must be rigidly enforced. The removal or suppression of everything that acts as an irritant must be attempted. Functional rest is imperative. The use of the voice, either phonic or in a whisper, must be controlled as far as possible. Talking increases the cough and causes a desire to clear the throat.

The first essentials in treating tuberculous ulceration of the larynx are absolute cleanliness; the regulation and proper amount of food; strict attention to the skin and the right amount of exercise in the open, all of which can best be carried out in sanatoriums under competent medical supervision. Medicinally, great care should be exercised in the amount and kind of drugs used. Local treatment depends on the stage of the tubercular process. In the early stages, when only redness and slight swelling exists, soothing sprays and warm inhalations, followed by mild astringents, should be employed. When congestion is combined with thickening, adrenalin may be added either by spray or applicator; in marked thickening, submucous injection of lactic acid or creasote may be used. These injections should be given in the quiescent stage and not while there is any temperature. In the ulcerative stages, soothing and cleansing sprays should be frequently used, together with the more active applications of lactic acid, guiacol or creasote, varying from 10 to 50 per cent. solution. For the protection and stimulation of granulating tissue there is nothing better than a weak solution of silver nitrate. Of the many drugs used for local applications the ones mentioned are the most popular. The pain on swallowing in ulceration varies from a slight degree to continuous and intense suffering. Warm inhalations of menthol and iodoform usually suffice for the mild cases, but orthoform anesthesin or cocaine are necessary for those of greater severity. Orthoform is perhaps the most potent and less harmful of all drugs used for this purpose; its value may be much enhanced by a solution in an oil called "basol," which will hold in solution 15 grains of orthoform and 10 grains of iodoform to the ounce. When these measures do not relieve the pain, menthol camphor and chloral hydrate in equal parts applied locally and externally will often give great relief. Tracheal injections with

warm medicated oil gives great relief in some cases. When a plan of treatment is selected it should be persistently, frequently and systematically carried out. Some claims have been made for the efficiency of the actinic and violet rays, but, having had no experience with their use, I will not discuss them.

A few years ago great stress was laid upon surgical treatment. Time and disastrous results in many cases have forced this method of treatment in the background except in carefully selected cases with skilled operators. The lesions must be accessible and localized, so as to permit of complete removal of the affected areas. The patient should be in good physical condition; there should be no exacerbation of temperature at the time of operation; no idiosyncrasy to cocaine. Cutting instruments are preferred when a complete removal, rather than destruction, of the diseased tissue is intended. The curette is preferred in the ulcerative stages to remove all the necrotic tissue preparatory for local medication and to relieve dyspnea in advanced cases. Much benefit may be derived by clearing away any obstruction to free nasal respiration. I have used the electric cautery with great benefit in a few cases. General systemic treatment should be pursued the same as in the pulmonary variety.

When we turn to climatic treatment we are confronted with a great many difficulties. In the first place, climate, like disease, is never stationary, and for one to remain in the most favorable climatic districts must be able to meet the expense incident to following up the seasons. It is only a small per cent. that can meet these demands, and the great majority must make the fight at home.

Tubercular throats do not do well in large cities, near the sea or large bodies of inland water. High winds, especially east and north, are detrimental to ulceration. They do better in a moderately warm and dry climate free from dust and winds. What we need most of all is for every county in our State to convert some of their beautiful hill lands into sanatoriums and equip them with every comfort and attraction, so that patients can receive the proper amount of exercise in the open; where they can be under

discipline and be required to do the things that would contribute to their own interest and others' welfare. What those infected people need most is to go into these sanatorium schools and be educated as to how the disease is contracted and how to get rid of it, and not rush them to other States and inflict themselves upon other people, spreading their disease broadcast. Every State and county can treat their own if they will take the pains to learn how. My observation teaches me that the well-to-do tubercular patient needs instruction and discipline as well as the poor. As long as these patients will listen to the advice of neighbors, newspaper advertisements and quacks, there will not be much progress in the arrest and spread of this disease.

I am convinced that with an early recognition and a well-directed treatment we can at least cure a small per cent.; and with all the rest, though we may fail to cure, we can do much to palliate suffering and prevent the spread of the disease.

SYMPOSIUM ON TUBERCULOSIS—FIRST FIVE PAPERS.

Dr. George T. McCoy, of Columbus: I had hardly left the State of Indiana when I heard in the sleeping-car that queer, wornout cough that tells us all of an individual far gone with tuberculosis. I had that individual as a traveling companion for 1,500 miles. When daylight came the next morning, and I had a view of that emaciated face and form, I felt that he ought to have taken his coffin with him. With him was his wife, who had that tired face that indicated that she was becoming very weary of her charge. The first thought that presented itself to me was that this individual should have been prevented from leaving Baltimore (his home, as I learned) and placed in a sanatorium there. He could not have been cured, but he could have been prevented from spreading the contagion all the way from Baltimore to New Mexico. Besides that, his wife might have been saved from the contagion of tuberculosis, and in my opinion there will be two deaths as the result of the failure to place the patient in a sanatorium.

In New Mexico I met ten "lungers" who went there all the way from six to ten years ago. Three were physicians. The others

were some of them engineers, some engaged as ranchmen, and some in mercantile business. All reported themselves as well. And they appeared to be well. I attribute the cure of these cases there to the fact that they have 320 to 340 days of sunshine, which enables them to live out of doors almost all the time. The outdoor treatment in that country is based almost entirely on the sunshine. They do not expose themselves to wind-storms or sand-storms.

After hearing the papers there is not much left to discuss, but a few points to emphasize. Poverty is probably the cause of more deaths in tuberculous individuals than anything else, because they can not receive proper attention and food. Improper nourishment more directly affects the tuberculous patient than any other class. When I say that poverty is one of the foes of the consumptive, I speak of poverty in the sense that they are not allowed a sufficient quantity of food. Statistics show that where individuals are deprived of the normal amount of food they resort to alcohol in direct proportion as the food is diminished.

There is one other point that should be emphasized in regard to school buildings, churches, theaters, etc., and that is the habit of dry dusting. This should not be allowed anywhere. Dusting should be done with a damp cloth, so that no dust is raised. Take the present method of street cleaning. What is the use of protecting people in one way when every time the streets are cleaned, with the windows open or upon the street, we are exposed to the dust? Therefore, these public places and the streets should not be subject to dry sweeping or dry dusting.

The recommendation of the Committee on Tuberculosis in regard to building a State hospital I want to indorse. As a member of that committee I do indorse it, and I hope this body will not adjourn until they start some movement looking toward having a State hospital for tubercular people established. In connection with that I want something done in connection with the establishment of a State laboratory. We need that. A good many phases of the papers come up that I would like to discuss, but there are others more competent to do so. Not having made any preparation, however, I feel like taking my place, at least.

DISCUSSION.

Dr. B. Van Sweringen, of Ft. Wayne: School inspection is a subject I have been interested in for some time, and have tried to have adopted by the School Board of Ft. Wayne, Ind. The reports of cities in which school inspection has been established for some time are so very encouraging that I think an effort should be made upon a larger scale, and should be taken up, for instance, by the State Association. It might result in the passage of a law by the Legislature which would deal with the question of the inspection of schools. If one will familiarize himself with the report of the superintendents of the schools of Boston he will find ample reason in that report why school inspection should be generally carried out, and I arise at this time to emphasize the importance of measures directed toward that end.

Now, another recommendation made by the report of Dr. Hurty was that diphtheria antitoxin should be employed as an immunizing agent. I think perhaps that is all right where cases are not under very close supervision. It has always seemed to me to be a useless thing to employ an immunizing agent when we have ready access or close contact with our patients. It is a specific if employed early. Immunizing is uncertain. In any case, if there is a child with diphtheria in a family, and another child becomes afflicted with a sore throat, it is easy at that time, or after the appearance of the symptoms, to give a curative dose of antitoxin.

Dr. John N. Hurty, of Indianapolis: The tuberculosis problem, as we all recognize, is most certainly the greatest economic question before us today. That one disease costs the people of the State more than the government of the State. This one disease—tuberculosis—costs the people more than it does to conduct its public schools. So you can readily see what an enormous economic question it is. It depends upon the medical profession to impress this fact upon our legislators. You know the legislators listen to the voice of the people. Statesmen, of course, go ahead of the people and plow the way. Politicians do not, and it depends upon the medical profession to impress it—and deeply, too—upon the mass of the people that this is the greatest of economic questions. Your

own pockets are affected by it. The revenues you get from treating consumption are revenues you do not want.

Another point: Here is a 1903 chart showing the effect of this disease upon different ages. Under one year of age it shows only 50 deaths, and so on, 2, 3, 4. At 5 it commences to rise. It rises up to 10 and 15, the school period, and between 15 and 20, which is the general period of implantation, and then between 20 and 25 see how the column rises, almost to 700 deaths—losing annually 700 people right in the prime of life. What an enormous loss it is. Then between 30 and 35 it gradually goes down. More deaths always occur in March than in any other month. Here is this terrible disease marching right through the year, paying no attention at all to the influence of the weather or temperature, killing and destroying. The weather and temperature have nothing to do with it at all. Age has something, seemingly, to do with it.

Then, looking at the other chart—these are the actual figures—we have an actual record for each one. There were mothers between 18 and 40 years, 790, that have left an average of two children each. Fathers between 18 and 40 years, 425, leaving 2,515 orphans. And we are building orphan asylums all the time. Of course, we build them for other causes, but not especially for this cause. Then the actual homes torn asunder by having either the father or the mother removed in the prime of life were 1,215. When the Purdue wreck kills a number of students what a horrible thing it is! Preventable, you say. Somebody must be punished. Right, of course. But what an insignificant destruction it is compared with this preventable disease. It depends on the profession to bring these facts before the people, and we can see how this profession can be an enormous factor in this economic movement.

Dr. Van Sweringen, of Ft. Wayne: I will move the adoption of the resolutions of the Committee on Tuberculosis.

The motion was seconded.

Dr. Theodore Potter, of Indianapolis: As a member of that committee I would like to make some remarks on that motion. We have spent a great deal of time investigating what has been

done the world over, and I only want to emphasize the importance of the State doing something to make provision for the care of the indigent consumptive. In the second place, to emphasize the fact that if we are to make a successful contest we have got to center the whole thing about the statement that tuberculosis is an infectious disease.

There is a little danger in the present methods of diagnosis which exclude more or less the personal equation, and of course this is desirable as far as possible—that we get too exalted an idea of these other methods of diagnosis as compared with the physical—that is, the X-ray, the microscopical, the tuberculin reaction, and so on. The X-ray is gradually improving. The apparatus is becoming more and more efficient, so that more can be seen, and yet when you remember that the shadows shown by the most powerful apparatus are those of gross lesions, or comparatively gross lesions, you can see at once that, as compared with other things, it is comparatively useless as a means of early diagnosis. It is possible that the X-rays may so improve that we may be able to see clearly areas of an infiltrated lung one-half or two-thirds as large as your thumb, but we can not now do so.

As to tuberculin, it is undoubtedly valuable in some instances, yet there is some uncertainty as to its specific value. The assertion is made that under some other circumstances the reaction can be obtained. Then, in the second place, there are cases where no reaction is obtained by any safe dosage; so that, though valuable when carefully and accurately applied, it can not be set down as a very valuable agent for the profession at large. Even the microscopical diagnosis has some drawbacks. A revolution has been wrought by the discovery of the bacteria and the possibility of identifying them. But this must always be remembered: While this is the only positive means of diagnosis, it involves the necessity that there shall be obtained material from the seat of the disease, and that it contain these germs. If these conditions can be fulfilled, very well; if not, it becomes of no value. But what I wished was to emphasize the overwhelming value of the physical diagnosis of early tuberculosis.

Dr. Harry Sharp, of Jeffersonville: I would like to say one word on the line of tuberculin as a diagnostic agent. I have charge of the Indiana Reformatory, with some 900 population. A year ago I examined physically every man in the institution, and out of that number I discovered some 252, as I remember now, tubercular suspects. I had these men taken in lots of fifteen and put in the hospital, placed them on a light diet, took their temperature, pulse and respiration every hour for 24 hours, at the end of which time I gave a hypodermic injection of tuberculin. In these 252 suspects I got 196 reactions, in some of them the temperature going as high as 105 and 105.5; others would only go 99.4. In glandular tuberculosis the glands would take on the active stage of inflammation, causing pain. In tubercular meningitis they would suffer from intense headache. In tubercular peritonitis they would have pain referred to the stomach, and some in the lungs. I remember one case of a knee-joint in which the knee got so reddened and inflamed that it looked like rheumatism. I usually put one or two healthy subjects in the hospital with the class testing, so as to demonstrate that there was no infection in the tuberculin that would cause septic fever. In one of these cases I gave the tuberculin to a healthy, full-blooded man, and he had a temperature of 104; but afterward I had Dr. Weidener, of Louisville, examine the sputum of this man, and the bacilli were demonstrated in the sputum. So that I believe it is one of the most reliable tests we have. It is an excellent way to verify the diagnosis after physical examination.

Dr. L. C. Cline, of Indianapolis: I do not wish to prolong the discussion. I am sorry there is not more time to devote to this most important subject. When we look at the statistics of Dr. Hurty and see the great number dying each year, I think it is high time that the State Association should raise a flag high enough to be observed by every lay and every professional man in this State, and impress them with the great importance of this movement that is sweeping this country. If we do not take it up and push it, it will be pushed upon us and we will be sorry we did not do it earlier.

SOME LATER-DAY TENDENCIES IN MEDICAL EDUCATION.

BY PROF. STANLEY COULTER, OF PURDUE UNIVERSITY.

A rational conservatism is the surest safeguard of the dignity of any profession or science. An irrational conservatism has in it many of the stigmata of a stubborn stupidity, and serves just as certainly to break down and bring into ridicule as does the other to conserve and dignify. It is well not to be moved by every chance wind of doctrine, not to swallow too avidly every new therapeutic theory, but it is well on the other hand not to be too strongly irresponsive in the presence of the new, even though it seem revolutionary. I can imagine nothing more startlingly revolutionary to the medical fraternity of his day than Pasteur's theses touching the causation of disease. How all the conservatism of the medical profession was arrayed against this man, who had not even the right to wear the title of Doctor of Medicine. But what a glorious fighter Pasteur was. Clearly and definitely he hied his adversaries to the real question at issue; disdaining words, he brought his test tubes into the academy for the disproof of his heterogeny and challenged his opponents to a similar experimental argument. Time and again he had to call them back to the fact that the matter was not one of oratory, but of fact, not a ground for fervid declamation, but for careful experimentation. The result was certain from the beginning—the ultraconservatives were driven into an obscurity from which no art of man can ever release them.

New things, even though revolutionary, are not necessarily either untrue or dangerous. Indeed, many in our own memories have proved themselves for the healing of the nations.

The day when any profession could build walls about itself and stand within them, apart from the rest of the world, making

its own laws, determining its own procedures, has long passed. Even the great wall of China has been broken down. It was a good thing for China when it fell, and it is a good thing for any profession to be forced out from behind the walls of an ingrained conservatism and compelled to catch step with the general march of humanity.

So great are the changes resulting from the community of interests arising from the complexity of our interrelations, from the marvelous developments in all lines of intellectual progress and from the far-reach of new truths that have come to us, that every profession and every science is compelled to make new adjustments if it would hold its own. It goes without saying, that, in a large measure, this new adjustment consists in a limitation of the field of effort, an endeavor to meet in part the intensified demands of the new time, by a fuller, more perfect knowledge in a more restricted field. After all, it is only another name for specialism. Nowhere is it more in evidence than in the medical profession. In no realm of human effort have the beneficent results of the fulness of knowledge resulting from specialism been more brilliant, from no source should there be expected a more certain and forceful support for every effort to make far more wide-reaching the fine results of specialization.

I go today to a physician to be examined and may be told as a result of the examination to go to another physician, as he treats only the nose and throat; the physician whose practice is limited to the eye and ear refers me in turn to the specialist in nervous disorders, and so, perhaps, through a much longer series. All of this is very comforting, for I know when I am diagnosed, I am diagnosed. Physician after physician has eliminated me from his category, and every step gives me new confidence.

Certainly this is the type of physician of today, or at least of the immediate future—the man of a thorough and complete knowledge of a restricted field—a knowledge so full and accurate as to give him a certitude in diagnosis and treatment that carries him far on the road to success in any given case. Under certain conditions the practitioner of the olden time—God bless him—

will persist, but in the more populous communities he is disappearing with a rapidity almost startling. So much for the premises.

If it is true that the trend in the direction of specialism is in the direction of progress, what ought to be done to improve the type of specialists? How does the man come into his specialty—by lucky chance, by natural aptitude, by force of circumstance or by the hard road of carefully directed training? I have seen general practitioners effloresce into specialists through the magic potency of a new sign—"overnight," as Jonah's gourd. If the trend in the direction of specialism is wrong, it is none the less, at the present at least, an irresistible movement; but what forces are being put in operation to direct the movement so that its dangers may be minimized?

It is this trend in the direction of specialism that has given rise to one of the modern tendencies in medical education—an attempt, for it is yet but an attempt, to introduce elective subjects, indeed, a fairly wide range of electives, into the medical courses. This is a means of furnishing an adequate preparation to the prospective specialist. An attempt, for example, to be less insistent upon the anatomy and physiology of the foot in the case of the would-be oculist and infinitely more insistent upon the anatomy and physiology of the eye and its appendages. To carry the study of the eye into the minutest details, to develop its most widely reaching and exceptional relations, to multiply instances and operations many-fold over that possible under existing conditions. Such specialization would greatly modify the work of the student. He would certainly know less of the foot, but he would have infinitely greater knowledge of the eye, with which he expects to deal. Would it be loss or gain? From the standpoint of accuracy in diagnosis and certainty in operation and treatment, an immeasurable gain. In any other line of special practice or in surgery, it is evident *prima facie,* how decided would be the gain by a differing emphasis upon different parts of some of the great fundamental subjects underlying medicine. It is nothing else than the substitution of a small knowledge concerning a large

number of things, for a large knowledge concerning a small number of things. It is the omission of nothing essential, it is simply a proper placing of the educational accent. Whether it be in anatomy, physiology, histology or bacteriology, the point is the same; the time spent would have as its resultant, efficient, working knowledge. In the medical profession, far beyond all others, half knowledge, superficial knowledge, is more than dangerous, it is positively criminal; and yet an examination of the curricula of our best and most thoroughly equipped medical colleges shows how superficial, at best, must be the knowledge of many of the most fundamental subjects considered.

In physiology, for instance, with all of its modern developments, with all its daily outreach into your daily experience, how much can be gained, think you, in the way of workable knowledge in the time allotted, if the whole field be covered with equal insistence upon every part? But it is manifestly possible to gain the underlying principles of general and special physiology, and using this as a basis, to emphasize more particularly those portions of the subject which bear directly upon the special branch of medicine to be pursued after graduation. The medical profession of today finds its borders infinitely extended; its cords have been lengthened, its stakes must be strengthened. It is no longer possible for one man to master the whole range of ascertained knowledge bearing upon the medical practice. What then? Recognize the vastness of the field; recognize the natural groupings within this great field and adapt the medical training to the production of men specially trained for the special departments. Thus far the advocates of the elective system in medical courses, who further point to the fact that long since, in other professions and sciences, of infinitely less vital importance than medicine, this necessity has been recognized and acted upon, greatly to the increase of their achievements and future possibilities. In engineering, in science, in law, specialization holds in the professional school, and why should it not be introduced in the medical school?

The objection to such elective or alternative subjects in the medical colleges comes not from the professors, but from the great body of practitioners outside of the college. I have talked recently

with numbers of professors in leading medical colleges, all of whom felt not merely the desirability, but the imperative necessity of some such flexibility in the curricula of their colleges if they meet the demands of the times upon them.

Personally I am expressing no opinion upon this phase of the subject. It is an existent and persistent question in all high-grade medical colleges, and in some form or other is being tested so far as those in charge dare. From the standpoint of a teacher pure and simple, a course of study so rigid as to admit of no deviations to meet new demands necessarily daily arising, which requires common studies and common examinations from those intending to follow widely divergent lines of work, is, in this day of grace, an anomaly, if not an absolute bar to progress. To one who looks only at results seeking efficiency and certainty in the presence of the complicated problems that present themselves, the rigid course, time-honored though it be, does not offer a promising field.

Incidental gains arising from such elective freedom in medical colleges, it is claimed, will be found in the classification of clinics, in the reduced size of sections, in the more personal and individual character of the instruction.

As I have said, I stand without, giving only the arguments of the advocates of the system, and asking this question: Is the conservatism which stays this step of the sort that best safeguards the profession, that best promises for its future development?

Another tendency in modern medical education shows itself in the building up of faculties of trained teachers instead of what Mulvaney would call "contajus" physicians. This course is based upon the presumption that a physician may be of the highest skill and success and yet unable to teach. Teaching is becoming more and more a profession requiring special training, and the man who has so devoted himself to his practice as to achieve a large measure of success, has certainly not had time to devote much attention to the technique of teaching, to the organization of logical and complete courses, to clarity and precision of statement. Success in the one almost necessarily precludes the idea of special

training for the other. It was perhaps to be expected that upon the close union between university and professional school, the standards and methods of treating would have to be placed upon a parity. Where such close connections exist, the part of the faculty doing the teaching work of the first two years, is largely made up of trained teachers. They have taken their degree in medicine, and, having taken it, have chosen to teach instead of practice. Into the hands of teachers of this type there is falling more and more completely each year the presentation of the fundamental underlying medical subjects. So excellent have been the results, that it would seem that no medical college could afford to be without the service of such a corps of trained and expert teachers. Even in those courses where the practicing physician and surgeon, by virtue of his practical experience, is alone entitled to speak, in subjects in which authoritative utterance can never be given by one merely theoretically trained, there is a growing insistence that the teaching be his chief interest, the practice the incident. An examination of the catalogues of medical colleges will show how rapidly this phase of the development of medical education is spreading, in how large a number of institutions the great mass of the fundamental subjects is in the hands of those who have never practiced medicine, but who forsooth are none the less authoritative on that account. For your trained teacher is necessarily an investigator, and out of his investigations he draws that knowledge which vivifies and gives authority to his teaching.

This, too, it is claimed, is in the direction of progress. Here again I pass no opinion, save this: The closer the nexus between university and professional school, the greater the number of trained teachers in proportion to the number of practicing physicians giving lectures, and the more powerful will the influence of the former class be found in determining the policy of the professional school. After all, this can scarcely be said to be other than a phase of specialization. Physicians trained for teaching; physicians trained for investigation; physicians trained for practice.

As a matter of course, there are certain subjects that must in

all cases be in the hands of the successful physician, certain statements that can come from no other lips than his with any degree of imperativeness and force. Such subjects are not embraced in this movement. They, perhaps, more than any other group of teachers, give character and tone to our professional schools, not often because they can teach, but because they can do; because, in brief, they crystallize theory in action.

No change in modern medical education has been more marked than this. Whether for good or ill, who dares say? It was an inevitable outcome of the wedding of the university and professional school. From the standpoint of a university president, no other type of faculty could be considered, indeed, no other type would be tolerable. As yet, however, the medical profession as a whole looks askance at this tendency and mourns the decadence of the practical and the increase of the theoretical.

It is certain that this movement, as well as the one previously considered, is being held in abeyance by the general conservatism of the profession. Whether for safeguarding or obstruction, the profession must determine. One thing is very evident, no amount of objection will ever prevent real progress; it may retard it somewhat, but the onward step will surely be taken.

A third tendency in modern medical education is the attempt by means of a proper recognition of work done in universities and colleges to shorten the time required for securing the bachelor's and doctor's degree. It is one of those movements which opens the way for untold discussion and misunderstanding. It is chiefly a movement to meet the demand for a shortening of the preparatory years and seems to sound in the zeitgeist rather than any other source. It would seem, from what is known of the requirements for admission, extent and character of work in universities, and requirements for admission and character of work in the professional school, that such an adjustment could be readily made. Experience has shown the practicability of doing in the university great blocks of work now clogging the schedules of the medical schools and impairing their general efficiency; not only can this work be done in the university, but it has been

demonstrated time after time that it can be better done than in the professional school. It has been proven by the records of students that those having taken a well-arranged line of special subjects preliminary to a medical course can complete the studies of the professional school not only well, but brilliantly, in much less than the prescribed time. Yet, in the face of such facts, the adjustment has not been made on any definite basis or on any extended scale. A man may go from the grammar grade of a school to the medical college and complete his medical work in four years. Scores of students now in every large medical college have had no greater antecedent training. Another one may add to this training a four-year high school course, and to that a four-year university course, specializing in the latter heavily, it may be, in chemistry, bacteriology, histology and similar subjects. He enters the same medical college as the former, and is by grace allowed to graduate in *three* years. All of his added and special training, all of the mental grasp and poise derived from the liberalizing effects of his university course, count him for *one* year. The result is a natural one, he omits the university training and goes up to the professional school utterly unfit for its work, incapable through lack of mental training to comprehend much presented to him in lecture, utterly incapable of seeing things in those broad, far-reaching relations so essential, so imperative in modern medicine. At best, he can make but a mechanical satisfaction of the graduation requirements, but *he has saved time.* That there is a heavy overlap between university and professional school, no one at all conversant with facts will deny; just how it can be remedied, no one can yet tell. Medical laws passed by virtue of recommendations of medical societies prescribe a certain minimum residence for the degree of doctor of medicine. Incidentally, it may be said, that this time minimum is greater than that required for the degree of doctor of philosophy either in America or Germany. The minimum evidently gives a limit to any credit that can be given for work, whatever its type or extent, done elsewhere than in the medical college. The student is not even privileged to examination in subjects he may have had elsewhere than in pro-

fessional schools. The minimum time stares him in the face. As the laws of the Medes and Persians, it changeth not, neither indeed can be changed. It seems to be the *crux* of the whole matter—the fulfillment of the time minimum.

Certainly no greater good could come to the medical profession than to have all entering upon it possess an antecedent university training or its fair equivalent. Just as certainly the present practice strongly discourages any such antecedent preparation. As a consequence, the grave and complex problems of medicine, and there are none in the range of our knowledge more intricate, are presented to untrained minds. It is little wonder that under such conditions so many charlatans and quacks write M. D. after their names as a matter of right. Three remedies suggest themselves:

1. A reduction of the minimum residence requirement.

2. The questionably honest one of considering the junior and senior years of the university course equivalent to the first two years of the professional school. A condition allowed where university and professional school are in organic union and utterly unrecognized in other cases.

3. Increasing the admission requirements to the medical college and thus by indirection giving encouragement to a sufficient antecedent training.

This tendency is in the direction of giving to the professional school a more uniformly and more thoroughly prepared body of students. It appeals strongly because of its bearing upon both the present and future of medicine. The problem must be solved in some rational way, if the best interests of the medical profession are to be subserved.

From my standpoint, by far the most desirable method is that contained in the last alternative. It is fairly certain that time spent in wisely ordered preparation is never wasted, whatever may be said of time spent in complying with a minimum residence requirement. It is absolutely certain that with the widening knowledge of etiology, of rational therapies, of preventive methods, of clinical investigations, none save those with thoroughly trained minds can cope with the problems daily arising or be suffi-

cient to maintain unsullied the high honors and dignities your profession has so fairly, even magnificently won in the past.

The three great educational tendencies in the medical schools of today are, then, these:

1. Electicism in the course.
2. Special training of teachers.
3. A more rational and time-saving connection between university and professional school.

All are being held in abeyance by the traditional conservatism of the profession.

Is this conservatism for the best interest of the profession in the future?

Are the medical colleges by this conservatism prevented from catching step with the onward march of other departments of education?

The problem is yours; the answer must be yours.

DISCUSSION.

Dr. J. F. Barnhill, of Indianapolis: If medical education is to assume the high standard indicated in Professor Coulter's paper we should as a medical body discuss this paper now thoroughly and very carefully, because the future of medicine, in this State, at any rate, will be largely molded and shaped and its destinies very largely determined in this association. Because, believe as we may to the contrary, the present tendencies of medical education are along the lines Professor Coulter has indicated, and they have received such a momentous educational force behind them that we could not stop their progress if we so desired. As I understood the paper it is his argument to direct it into the proper channel and secure the wisest course and a good outcome.

Discussing the paper somewhat as it has been given in its three divisions I would say that, with the extreme views which the Professor has indicated in his paper eliminated, medical specialism has its very high—I might say it has the highest—value in medicine. However, I think there is ground for argument as to how soon the medical student during his course of medicine, or

the physician during his first years of practice, should begin his special work or special study. I believe it is true that the greatest specialists of the past and present have not only taken the prescribed medical courses but have also practiced general medicine for some years before they would begin to specialize their work. Our profession has looked with a great deal of suspicion, Mr. President, upon those who upon the day following their graduation have seen fit to write "practice limited" after their titles. The first division of the Professor's paper would rather lead students at present, and under present conditions and under present beliefs of the people, to write this term "practice limited" too soon, I believe. If we would make the narrowest-minded, the most conceited and the most harmful of professional men, then we should create a tendency that would graduate a specialist and not a doctor.

We as general practitioners of medicine know there is a relationship, an interdependence, between and among diseases which no man can rightly grasp unless he has for a time studied the whole and for a longer time practiced the whole. Consequently the man who has become a specialist from the first can not recognize that interdependence and relationship which is absolutely essential to the successful practice of specialism in medicine. Why should not the graduate practice the whole for a time and then select a specialty and practice it? Very few men at the student age are capable of knowing what they are best fitted to do in medicine—what their capabilities are and what they might best succeed at.

The second tendency which Professor Coulter has spoken of, namely, that of having trained teachers, specialist teachers, if you please, in the medical colleges, I believe is correct, and the tendency of the times is toward that end. Probably no opposition will hinder it. For the first two years of medical college work is, or is rapidly becoming, pure science work, and, in so far as I am able to judge, there is no more reason why the practicing physician should teach these pure sciences than that he should teach algebra or astronomy or botany, or any other science. The Professor has very ably indicated that this should be done. I

believe there is no professional man whose knowledge of present conditions is such as to give him a clear insight into the future of medicine who would not say that this course would be the best, and yet as medicine exists in this State today such a course would be entirely impossible. The medical colleges of this State have existed because of the fact that men eminent in the profession—I might say the most eminent in Indiana, have become teachers without pay in order that such colleges might exist in our State and in order that medical education in our own domain might be commensurate with that of other States and of the times in which we live. But if we select such men as the Professor has spoken of, ideal men we must admit, whose time is all taken up by such teaching, who give their entire lives to the work, first to preparation and later to teaching, the expense must be very considerable indeed, and as at present organized it would seem as I have already indicated, such a course in this State would be impossible.

Dr. William Ch. White, of Indianapolis: The timeliness of the paper submitted by Dr. Coulter can not be exaggerated. The dismemberment of our profession into the different specialties as it is at the present time is the most serious problem we have to face now. What, then, is the synthetic means by which we are to bring this body together? It must be by the teaching in the primary subjects for the first two years. We are responsible more or less as teachers for the specialization which goes on by admitting our students during the first two years to enter into clinical studies. For no sooner is the student allowed to handle the tongue depressor or the thermometer than he becomes conscious of the fact that he is, in his own belief at least, able to practice medicine, and he neglects his primary studies. It is not possible to serve two masters. It is not possible to practice medicine and teach laboratory subjects that demand so much time—chemistry, physics, anatomy, histology, biology and pathology, that require from five to ten hours a week of steady teaching in the laboratory, with individual work. The students must be taught individually, and here must be laid the foundation for the practice

of medicine. They must be perfectly familiar with the normal before they attempt to study the pathological, whether microscopical or clinical.

There might be a solution to such a difficulty. The State has given support for all other departments of education. It has given for medical education nothing at all. The State should have very serious care for the medical education of students, because it is something that involves every person in the State, whether patient, doctor or teacher. Why then has not the State given money toward education in our medical colleges? Probably because they are proprietary institutions. It is easiest and best and it is right that clinical subjects should be taught by practitioners, but it is not right that primary subjects should be taught by men whose living is subservient to the practice of medicine. It is right that the State should pay teachers to educate men for this work of taking care of the lives of its citizens. It should not be borne by these private institutions and it should not come from individual beneficence as in the East. Every man who enters a medical college should enter it upon a uniform basis and with the same primary education, and should take in the first two years that basis work on a perfectly equal footing. This means that we must pay our teachers in the primary subjects a sufficient amount to demand their time for a certain period each week, or in some departments each day, and this money should come from the State. It is not possible for the schools to receive money as long as they are proprietary schools. They must either become departments of the State schools or the first two years must be spent in existing State schools.

We have also certain clinical facilities which are not utilized which the State pays for and which should be used in teaching students. I refer to the clinical facilities in the State institutions. There is no reason why this material should not be used. This, it seems to me, is a feature that might be put in force with the greatest benefit to everyone concerned.

Dr. George D. Kahlo, of Indianapolis: It is certainly very encouraging to the outlook of medical education when such men

as Professor Coulter give it such earnest consideration. There should be no doubt in our minds that we are at this time going through a period of development—of evolution, so to speak. A like experience is being had in almost all undergraduate institutions. The question has not yet been quite definitely settled as to the relationship between the high school and the university. There can be no doubt a more intimate relation between the university and the medical schools with better results all round. And yet I question somewhat whether it is advisable in the change now tending to emphasize university training at the technical schools. A plan has been proposed to spend four years in a preparatory school, during the last two of which students should have medical instruction in the primary branches and then spend two years in the technical school. Or, again, three years in the undergraduate school and three in the technical school. If the training is to be technical in character why not emphasize more particularly the teaching along this particular line? Professor Coulter asks rightly if our conservatism is not too conservative. It seems to me also competent to ask, Are we wasting our time and endeavor to graduate professors of medical institutions or seeking to graduate physicians and surgeons, leaving it to the future and further experience to develop fully whether they shall acquire this rather questionable distinction?

Another question which seems to be open to some argument is the question of training specialists in undergraduate schools. How many students enter medical colleges competent to decide what their future is to be? Are we to entirely ignore the influence of environment or post-graduate study and experience in determining whether or not a man is to be a specialist? Have we got to the point where the general practitioner of medicine is simply a medical director for his more favored brother in the profession? In saying this I do not wish to be understood as underrating the specialist. The well-trained specialist has certainly a very glorious mission, and his very training entitles him to speak with greater authority upon the subjects in his special field. But the man who is trained as a specialist in an undergraduate medical

school is a man who is apt to be narrow in his conception of his specialty. He is apt to attach too great importance to diseases or organs coming within his special field and possibly to ignore the influence of symptoms which have an important though remote influence in the causation of these diseases. Dr. White has indicated a possible solution of the question in our own State. I think we should receive from the State, and we deserve to, some assistance in the medical education of our students, but apparently so far there is no disposition to grant such assistance and we have no great philanthropists to whom we can look for endowment.

Dr. Henry Jameson, of Indianapolis: There are one or two things that suggest themselves to me in connection with Professor Coulter's admirable paper. It is a matter of such vast importance to the profession at this time, it seems to me more time should be given to its discussion. The profession of medicine is more interested today in medical education than it has been heretofore; at least that is so in the State of Indiana. And not only the medical profession, but the laity, the educational world in general and the literary world are taking a deeper interest than has heretofore been the case. Why this is true we do not need now discuss. The points which suggest themselves to me are these: The first consideration is the question of specialization. I do not wish to seem to advocate either generalization or specialization. It seems to me as we progress that matter will adjust itself. The only danger we have to contend with is the one that comes in every movement that is progressive. When we discover any weakness in anything in the field of human endeavor we begin to try to correct it, and in doing so we are apt to go to the other extreme. That is the case in all movements of reform or progress. There is a normal line to be drawn between generalization and specialization. We all recognize that if we would take a human being in a condition to receive an education and confine him to one line of development he would become abnormal. I am drawing this extreme case to show where we might lead. While specialization is desirable, it is based largely upon the presumption that

the human mind is only so large; that there is only just so much of it. Now as a matter of fact I have always believed that the mind in a healthy individual could enlarge itself to almost any extent, and it does become larger and more profoundly educated in any special direction by generalization and not by specialization. If we specialize on something we simply dwarf or narrow ourselves. This applies to medicine as well as to any other department of life, and what we are to discuss and settle is to what extent our educational institutions should carry us on in the matter of specialization. Better work is being done by the specialists than was ever done by the general practitioner, but when we carry that to an extreme we will find certainly that specialism, to use a vulgar phrase, will go to seed and its votaries will become narrow. They will not understand their relation with other things in medicine and we will then have a movement in the other direction.

Now a word as to the question of division of work in medical education. It seems to me there is a distinct contradiction in our position in relation to this and in the tendencies in relation to this. We criticise in one breath our medical curriculum. We say the time given to physiology, or any other subject, is too short. In other words, we are not specializing sufficiently on all the branches. We are not giving sufficient time for the education of students. On the other hand, the tendency is to divide up, to reduce the length of time we give to these subjects in our technical institutions and generalize in the university course. Now there is a contradiction somewhere here. After all I think this matter will adjust itself. And I do agree with some of the speakers and also with what Dr. Coulter has indicated, that the medical profession should certainly, through the universities or otherwise, receive help from the State for the immense work that is to be done in this field. It is just such papers as Professor Coulter's that are written and read before societies of this character that will develop thought in this direction and inevitably result in progress and good, and we will strike the happy medium between over-generalization and over-specialization.

Dr. A. E. Sterne, of Indianapolis: I commend the spirit of Dr. Coulter's address most heartily in the direction of the elevation of the standard of medical education. Dr. Coulter made some of his remarks in a veiled form and wisely withheld an opinion upon various points that he brought out. I think we may consider that he has given this subject very careful and deliberate thought. But he has never been in the practice of medicine, and he does not always realize some of the exigencies that confront physicians in his purely teaching capacity. Those of us who deal with medicine practically and who are in anywise connected with medical institutions as teachers realize that there is entirely too much deficiency in our students in various directions.

Now as regards medicine especially there are certain things which appeal to me strongly. First, it would be a mistake, in my estimation, to train specialists in undergraduate institutions. There is too much of that done already. The physician who aspires to be a specialist must be a thorough physician. He must understand the relationship between general and special conditions, for no specialist has a right to look at his limited field through a narrow speculum. There is a method by which this could be obviated. If specialists—and in a measure I believe in them—are to be trained they should first become physicians. They should become such in post-graduate work. They may lay down the trend of their studies before adding the medical degree; but the particular specialty to be followed must be the result of years of observation and work after graduating from the school of medicine. Second, we can obviate this difficulty by an examination. What right has any medical college, whether one touching a high plane, or any other, to give a man a license to practice medicine in this or any other State? The right to practice medicine should belong to the State. The doctor's degree can be conferred by medical institutions, but the right to practice medicine on the people of the commonwealth should lie with the commonwealth. If the State will give to every man an examination of such severity and of such high standing that if he passes it brings with it a guarantee to the public of his ability to practice medi-

cine, then he is a physician. After that he may take any special branch that he aspires to. I believe that would be the best method of overcoming the reckless tendency to over-specialization in a narrow field. The greatest specialists in the world decline the honor of being called specialists. They say they are doctors. But above all, and therein Professor Coulter is right, they should be educated; should be well grounded. The preliminary education should be better before they enter the medical school. Superficialism is blinding, and that is what we must eradicate; and just as we become too specialized so we will make superficial men. And just so much as one devotes himself to one specialty will he become narrow and unable to cope with general conditions.

Dr. Theodore Potter, of Indianapolis: I want to say a word on one of Dr. Coulter's propositions, and that is the necessity of training medical teachers as such to devote themselves to the work. That I think is correct. That tendency is growing. It will grow more. But I want to enter a protest against the qualification that is always put into that proposition, and that is that your teacher of the so-called scientific branches, of physiology, anatomy, biology, etc., should devote himself to the work as a teacher, but your teachers of certain other departments should be free lances. Now I confess I do not agree with that proposition. See what the outcome of it is.

Suppose in Dr. Coulter's institution it should be announced that the professors of biology might have a salary of $700 a year, but the professors of the department of electrical engineering should have $7,000. How would you expect to keep very many teachers in the department of biology? You can not do it, and you can not do it in medicine. As long as you make that distinction just so long will you have the former looked on as petty and the latter elevated. Just so long will you have men aspiring to get out of the former into the latter. So long as you maintain the combination of practitioner and teacher just so long you will keep the commercial aspect of medical education. We have heard much of the iniquity of that during the last few years, and we are told when we get on a university basis that will be elimi-

nated. And yet today the most glaring example of commercialism in medicine is that found in one of our institutions that most nearly comes to the ideal, and that is Johns Hopkins. The medical journals have been full of the enormous fees received by Professor So-and-So, of Johns Hopkins. That is the outcome of supposed ideal conditions. A few men are set up for the rest of mankind to worship as practitioners. As long as we have the combination of the practitioner and teacher just so long will we have what Fort Wayne and Indianapolis and Chicago and Johns Hopkins have, the combined teaching and so-called commercial faculty and the maintenance of the institutions in which that condition exists. And so we should not take the view that the scientific teacher is to devote his time to the institutional work and the practical teacher not. I believe the view commonly held is based on the conditions heretofore existing. But we will have more men devoting themselves to the science of the practice of medicine, regardless of popular or commercial considerations. I maintain, although it may be an ideal condition, that with the combination of the dispensary and the hospital with a teaching institution there will be abundant opportunity for a man to become a scientist in the practice of medicine, and he may devote his time to clinical study and to teaching the practice of medicine and allow the private practice to go to others. When we reach the condition that all the men in medical institutions shall be put on the same basis, and all of them scientists, and all expected to devote all their time to study and practice and teaching in the hospital, dispensary and laboratory, then we will have reached an ideal university condition in the teaching and practice of medicine. And I maintain that time may come, though it may be some time off.

In speaking of the clinical faculty of Johns Hopkins as commercialized, I mean no reflection upon that fine medical school nor upon the motives of its clinical teachers. I simply use the term which has been so much used in criticism of other medical schools, and as a reason for their extermination, in order that the ideal university school, the noncommercialized school, may have full sway. And yet the same thing exists in the supposed

ideal university school, and the reason is in the combination of teacher and private practitioner in the practical chairs. Remove this condition and you reach the ideal teaching-institution. Remove this condition from the plan of the ideal schools and the criticism upon the others as proprietary and commercialized becomes valid. Until then the criticism is unjust and therefore invalid.

Dr. L. H. Dunning, of Indianapolis: Dr. Potter presented the line of thought I had in mind, and presented it so much better than I could do it that I am glad he did it first. There are two or three thoughts that come to me that need to be emphasized. I was very much distressed when one of the speakers felt that he must apologize for the conditions in our medical colleges in teaching the preliminary branches. I have been distressed because I have been watching the development of our best men for many years. For instance, I remember fifteen years ago helping to instruct a young man, helping to make him an all-around doctor, a splendid doctor. I worked with him in the back alleys, removing fibroid tumors and ovarian tumors, and work of every kind. Finally he got a position as demonstrator of anatomy and worked at that for five or six years. He was a superior man and a little more was given to him, and by and by the professor of anatomy moved up to the chair of surgery. And who took the chair of anatomy? The demonstrator, because he was the superior man. And so with the teacher of pathology. I watched his development for ten years and he is now professor of pathology. I have associates in my department at the present time who have been studying and practicing my branch and thus become ready to take my place when I step out. I could follow that out in every branch of the medical school I have in mind, and it is wrong to call such a school a "proprietary school."

Two days ago I received a letter from an undergraduate in Chicago asking me to take him as my assistant in the physical diagnosis of diseases of women. He said he was abundantly able to fill the position because during the last two years of his course he was specializing on that subject. He wasn't graduated yet

but would be in July. How could I find out whether that young man knew anything? Why, by taking him to the bedside. I have in mind three men. One worked for ten years before he got a professorship. Another man is a quiz master. He will become a lecturer in four or five years. That is the way to make specialists. When you begin to specialize from the beginning you cramp the student. You want to make a good, big, all-around doctor and then let his aptitude direct him into a specialty.

Dr. O. C. Neier, of Indianapolis: I am not a teacher in a college and not a specialist, but this question is one of vital interest. There is one point that I would like to bring before the association. It rather seems to me the discussion has been one-sided. It is true our specialists should be broad men in the profession, but the great difficulty is that the common doctor as turned out of the college is presumed to be a specialist in all the specialties. After graduation they are supposed to be ready to do any operation on the nose, ready to operate on any case of appendicitis or ready to take charge of a serious eye case, one which might result in the total blindness of the patient within a couple of days, and as I viewed these conditions I rather thought Dr. Coulter's ideas were in the right line. I believe the specialist should have special training. His curriculum should be ordered to include all those subjects that pertain to his line of special work.

Dr. H. O. Pantzer, of Indianapolis: While attending lectures at Munich, under Ziemssen in 1885, he one day reached the stage where his typhoid patient was convalescent, and he made a remark that might apply to the situation here. He said: "And now, gentlemen, having your case convalescent, send the patient to Italy for one year, or do as nearly to that as possible." In this question, having a practical question at issue, it is well to accentuate one thing. What is the real thing to aspire to, and then afterwards adjust our means to this end as nearly as possible. I think by this means we will be able, perhaps, to come together harmoniously on a matter that is of such vital importance.

I desire while I am on the floor to express my thanks to Professor Coulter for a paper that has been so highly suggestive.

Dr. W. D. Swartz, of Portland: It has been most thoroughly emphasized by everyone on the floor that preliminary education should be insisted upon by all medical colleges. I don't think you should keep out the young man who comes from the rural districts and who is compelled to make his own way and has not the means to go through college. As Dr. Dunning has said, the man who shows himself apt in a certain line, and not on theory, but by actual experience at the bedside that he is ready to take his place when he relinquishes it—he is the man to advance. It is not always the college graduate. It is not always the man who makes the best grade in the medical school who makes the best practitioner and is the best physician at the end of ten years.

Professor Stanley Coulter, of Lafayette: Certainly after the courteous discussion of the paper I would not consume your time further. But I wanted discussion, and I got it. I am reminded of the story of the boy with the pancakes. He said he never could get enough pancakes. One morning his mother determined to give him all he wanted. So she baked and he ate, and she baked and he ate, and finally he stopped. His mother said, "Johnny, don't you want any more pancakes?" He said, "No, and I don't want those I have got."

CLINICAL CONSIDERATION OF ARTERIOSCLEROSIS.

BY A. C. KIMBERLIN, M.D., INDIANAPOLIS.

To the diagnostician possibly no disease opens such a vast field for new and important work as does the recognition and differentiation of the diffused form of arteriosclerosis which occurs most often in young adults with no known or definite etiological history. Insidious in its onset, varied and anomalous in its manifestations as well as important and influential in the treatment of both medical and surgical diseases, it becomes well worth our best efforts of close study. Sometimes it remains entirely latent or evidences a few and vague symptoms only, until the organism is attacked by some acute infectious disease, some operation is undertaken, or the individual is subjected to some great nerve strain. Then the real condition manifests itself in no uncertain way, often defying all theories and fixed rules of medical and surgical treatment, as well as contributing surprises to our mortality list. The first clinical manifestations may enjoy the wide range from simple constipation to impotency. Owing to the meager literature on the subject, it is but natural that errors in diagnosis are common. Yet in most cases the careful study of the early clinical history of sclerotic subjects, a thorough physical examination, with an oft-repeated and complete urinanalysis, will make the diagnosis quite exact.

The most common error next to the failure at recognizing such a disease at all is the frequency with which it is confounded with chronic interstitial nephritis. Symptoms and physical signs of each are so similar at different stages that such diagnostic errors are easily made and the surgical prognosis, especially in Eddebohl's operation, so frequently proves a great disappointment to all concerned. A careful study of the microscopical and chemical properties of the urine, while not of itself reliable in differentia-

tion or diagnosis, yet when combined with the study of the physical signs, becomes of significant value to the clinician. The increased flow of pale urine so pathognomonic of chronic renal degeneration is not so constant, and is likely to be more variable from time to time, providing the kidneys are not equally involved in a general sclerotic process which may be present. Subjects of true arteriosclerosis at times void large quantities of urine of low specific gravity, with a large solid content. And, also, such patients are not so early or regularly troubled with nocturnal micturition as those suffering from degenerative changes involving primarily the kidneys only. Chemically, albumen is much more constantly present in primary nephritis, which is not equally true of arteriosclerosis. Clinically simulating chronic nephritis by its occasional local edemas, albumen is not impossible in arteriosclerosis, but yet neither so constant or so marked as in primary nephritis. Microscopically tube casts are so frequent as to be considered physiologic, or in the absence of other symptoms, insignificant, at least, and while their presence is not pathognomonic of either arteriosclerosis or chronic nephritis, yet they may be confidently expected in the great majority of cases of primary renal degeneration, but they are not so frequent or numerous in general sclerosis as in primary nephritis. It is always well in cases of arteriosclerosis before the appearance of the grosser lesions to carefully examine the physiological amounts and constituents of the urine rather than depend too much on the significance of the pathological, as the variation or alteration of the former is among the first and certainly one of the most constant evidences of disturbed or diminished tissue metabolism, while the latter may not point further than the kidneys.

This urinary evidence of faulty metabolism resulting from arterio capillary fibrosis is practically always associated with one or more very constant symptoms, as subnormal temperature, loss of weight, exhausted nerve energy, or peculiar facial expression, all so common and characteristic of this disease, occurring in subjects where age, vice or dissipation can not be reckoned on as a predisposing influence. The frequency with which we utterly

fail to find evidence of the supposedly more common predisposing causes forces one to the belief that the process is an autoinfection. Toxins, whether formed in the intestinal canal or developed within the tissues themselves, are a most common etiological factor in producing capillary fibrosis. Thus we have an explanation of why so many subjects of arterial disease are not only under weight, but are never able to regain the lost weight caused by the first influence of the etiological factor. Certainly there is a strong hereditary predisposition in families to premature arterial degeneration, nearly as marked as in tuberculosis. Hence the frequent observation of cardiovascular disease, varying only in location or stage in parent and child or children of different ages. Older members of the family present evidences of the so-called "idiopathic" organic heart lesions, while younger ones will be suffering with some of the nervous manifestations of arteriofibrosis. Hence this disease is frequently found among young adults, especially young men undergoing the great strain of a successful commercial or professional life. Nerve tension, even if not great, when prolonged, can not be ignored in their symptomatic and etiological significance. Here, too, one of the greatest difficulties confronts us in our clinical studies and diagnosis of these cases, for a born neurotic may present a condition so entirely like the first nerve manifestations of sclerosis of the deeper nerve centers that the differentiation of the extreme physiological and pathological condition may at first be quite impossible.

Such subjects are generally active, excitable, given to magnifying slight responsibilities or complain of a feeling of great dread or apprehension, and are entirely unable to rest or relax, either mentally or physically. They rarely suffer from mental lassitude or melancholia, although often unable to accomplish much for want of power of mental concentration. Of the sensory disturbances so frequently present, the unfailing weariness is most common and characteristic. The insomnia at intervals is a very regular symptom, although the unsteady gait, muscular tremor, etc., are not infrequent, while the vertigo, irritability, failing memory, various neuralgias and disturbed reflexes leave no doubt of a gen-

eral disturbed nutrition due to sclerosis and subsequent narrowing of the smaller vessels of the nerve centers.

While the study of the condition and function of the kidneys is indispensable to the proper understanding of these cases and together with the clinical history will often complete the diagnosis in many, yet the condition of the heart and blood vessels themselves is probably of most interest and help to the clinician in the diagnosis of arterial degeneration even of the diffused form. As previously stated, arteriosclerosis may present many and varied symptoms, consequently we meet many typical cases. The clinical manifestations will vary only with the intensity or location of the disease, and the clinical phenomena correctly interpreted will in most instances direct our efforts and attention to the anatomical seat. The pallor of the skin which most of these cases present is not wholly due to the anæmia so very commonly present, but is largely due to the want of a full peripheral circulation. Hence the dry and inactive skin and subnormal temperature, both of which are invariably to be expected in young adults suffering from the diffused form of arteriosclerosis.

The constancy of this condition of the skin and the fact that the various symptoms are so little influenced by baths and eliminative treatment helps to differentiate from the condition found in chronic nephritis, which is more inclined to be periodical in its climax, and by the forcing of the blood from the surface into the splanchnic area causing a very decided tendency to congestion and consequent adhesion of the various serous membranes, especially the peritoneum. Often similar congestive influences are manifest on many of the mucous membranes, especially of the respiratory tract, evidenced often by a chronic bronchial catarrh accompanied by a cough, with an engorgement of the superficial veins, all giving unmistakable evidence of contracted or narrowed arteries. The full radial, tortuous and prominent temporals, irregular brachials, palpable carotids and high arched subclavians are all, especially the latter, very constant and pathognomonic vascular signs of prolonged peripheral resistance. With the early clinical history and oft-repeated urine analysis, primary nephritis can be precluded and the recognition and prognosis of sclerotic subjects

be made practically and fairly easy, certainly helping us to relieve our minds, at least, in regard to many heretofore very annoying and perplexing patients.

In a study of the heart and its valves they will be found much more variable than in interstitial nephritis, owing to the frequency with which the myocardium is primarily affected, through the sclerotic changes, partially or ultimately causing complete obliteration of its arteries. A careful study of the location and force of the apical impact and character of the first heart sound will give a fairly accurate idea of the stage and progress of the disease.

The character of the valve sounds, as also the significance of adventitious sounds or murmurs, are likely to be extremely varied and difficult of interpretation, the latter changing in quality from time to time, often disappearing entirely to reappear later, all from no definitely known cause, but most probably owing to the degree of tension and strength of the myocardium, which can be estimated quite accurately, as before said, by the location of the apical impact and the quality of the muscular sound.

Case No. 1. Merchant, age 32, small in stature, rather sallow and anæmic in appearance, with a good personal and family history; very nervous and excitable; a big eater. In 1897 became more or less constipated and excitable, which continued until 1898, when he became afflicted with occipital headaches, running down the spine; showed a dry and inactive skin, with a full pulse of high tension, with excitable, forcible heart action and signs of slight concentric hypertrophy; voided large quantities of pale urine, having a specific gravity of 1012; showed nothing microscopically. Headaches occurred in the hot season; was advised to stop riding his bicycle; in 1899 his headaches became much more severe; suffered from vertigo occasionally, grew extremely nervous, very wakeful at nights and was easily aggravated and worried over his business, which was extremely prosperous. In June was confined to his bed one week from pain in spine and head and extreme weakness and inability to sleep. Baths and cathartics proved of little avail and nitrites gave only temporary relief. Was a half invalid all summer, with no symptoms but weakness and nervousness. Rest from business and country

drives did more to relieve the dreadful suffering, seemingly, than medicines. During 1900 suffered rheumatic and slight neuralgic pains, sometimes in the precordial region; insomnia, if possible, grew worse. Visited the springs on one or two occasions, with but temporary relief. In 1901 passed from under my care, being advised by a neighbor doctor to try static electricity, after which for a time he seemed much better. Later he suffered a return of the precordial and lumbar pains. The latter part of the winter he again returned to me for treatment, but in June, 1903, was seized with a pain in the lower abdomen, extending down to the left testicle, which was not retracted. This I failed to relieve by any kind of drugs. After some weeks he again passed into the hands of another physician, who insisted that he was suffering from a vesiculitis and advised him to have massage treatment, which he undertook with great hope, but no relief. The first of November he returned. Middle of the month he was seized with a severe pain in his left hip while asleep, then passing to right shoulder and finally centering, as it were, in the precordial region, evidently assuming the true angoid type, to which he almost succumbed, being subsequently confined to his bed for two weeks.

February 26, 1904, physical examination showed the typical signs of concentric hypertrophy; the arteries differing a little from the ordinary, were hard and rather large and the walls thick. Urine for 24 hours, 60 ounces; specific gravity, 1006, and urea, 7 per cent.; microscopically, nothing. The microscopical analysis did not at any time show more than an occasional hyaline cast.

Case No. 2. Student, age 25, good habits and good family history except one grandparent, who was asthmatic. Suffered from asthmatic symptoms after exercise at the age of 19; had scarlet fever at the age of 22. Previous to his scarlet fever he complained of feeling tired and weak, and grew extremely nervous. His weight at that time was 167 pounds, measured five feet nine inches, having lost in the past two years twelve pounds, notwithstanding he had taken cod-liver oil and quinine for nearly a year, supposedly suffering from chronic malaria. In appearance looked badly nourished, skin was sallow color, had a premature old ap-

pearance. The heart showed decided left hypertrophy, with a slight displacement of the apex. Strong first sound; aortic valves clear and accentuated; pulmonary normal; tendon reflexes slow. Pulse 82, small and firm; arterial walls thick; urine 54 ounces; urea 1.4 per cent.; urine otherwise normal. October 10, 1904, weight 152½ pounds; showed a soft murmur in the tricuspid area; apical impact not so strong. February 24, 1904, physical signs practically the same, but no murmur to be heard; complains of great tire and uneasiness and a feeling of something serious going to happen. Sleeps and eats well, bowels regular; weight, 147 pounds; urine, 52 ounces for twenty-four hours; urea, .9 per cent.

Case No. 3. Banker, age 24, five feet eight inches, weight 149 pounds; brunette, of fine muscular physique; active, nervous temperament; good habits and good family history. Only sickness was measles when child; was a hard student, graduating with honors at the age of 23. Last two years of college life did much night work and in 1900 noticed a throbbing of his head on retiring. Suffered from time to time with various slight ailments, mostly of a nervous character. Called at the office in March, 1903, with extreme vertigo and excitement, greatly exaggerated reflexes. Physical examination showed a slight left hypertrophy; first sound was strong and apical impact was very forcible; the aortic second sound, clear and ringing; the radial pulse full and tense; the arterial walls while firm, not especially thickened, but did not collapse when emptied. The temporals were very tortuous and there was present a small sacular aneurysm of the supra-orbital artery. Very soon there appeared a fusiform dilation of the frontal artery, just in the edge of the hair. The large arteries seemed straight and all were easily pliable and showed evidence of being thick. The urine was of a good quality, 39 ounces in twenty-four hours, specific gravity 1020; microscopically nothing.

February 27, 1904, weight 146 pounds, arterial walls appreciably thick, but pulse not so tense. Temporal arteries seemingly more tortuous. Deep cardiac dullness increased to the left; the impact not so strong. The aortic second sound was not so accentuated. There was present a soft systolic murmur, exaggerated

in recumbent position, heard in the mitral area, transmitted to the clinical base. The urine, 42 ounces; urea, 1.8 per cent.; otherwise normal.

DISCUSSION.

Dr. George D. Kahlo, of Indianapolis: Dr. Kimberlin has given us a very full and graphic description of a disease frequently unrecognized—a disease which comes to all mankind if we simply live long enough; which comes at different periods of our lives, according to our inherited susceptibility, and depending upon our manner of living. The conditions of life in this country are such as to particularly conduce to such a condition as the essayist has described, and I believe we could with equal accuracy say of arteriosclerosis that it is as much entitled to be called an American disease as is neurasthenia or paresis.

I mentioned in the beginning that arteriosclerosis is often unrecognized. We may have been falling into the careless habit of counting the pulse at the wrist without taking into cognizance the quality of that pulse. Another error frequently made is in not observing the character of the pulse in the tube. Oftentimes we will see differences which will at once direct our attention to some defect in the arterial circulation. Of course, it takes practice and experience to detect slight variations in the hardness of the pulse. A full, strong pulse is not a hard pulse. A distinction should be made between a hard pulse and a full pulse. Sphygmographic tracings depict very clearly the difference between a sclerotic artery and a normal artery. We observe in these tracings a prolonged summit, which shows a tardy relaxation. We have, in other words, a pulsus retardus. The urinary indications, the symptoms of precordial distress and those with reference to the nervous system, all point to the possibility of changes in the arterial system, which are the beginning of a degeneration of the whole system.

The prophylaxis of arteriosclerosis it is also the prophylaxis of cerebral hemorrhage, and often of interstitial nephritis and many other diseases which are recognized long after we have had the indications in the arterial circulation. Dr. Kimberlin has not

spoken particularly of the treatment of this condition. It is practically to prevent the occurrence of this disease in the first place. There is no more important factor, none so important, in fact, in the causation of this disease as a faulty metabolism—faulty digestion. The tendency is to eat too much and take too little exercise. There is, consequently, a gradual accumulation in the system of excrementitious products which act directly as irritants to the intima of the artery, and we have as a result the sclerotic changes which we recognize by the pulse and the other symptoms already described.

Dr. A. P. Buchman, of Fort Wayne: My experience is that when one has an arteriosclerosis that you can recognize you will find a pretty general fibrosis—a fibrous degeneration—and you will find a disease of very widespread influence. The lungs, the heart, the kidneys, the liver, and nearly every organ of the system undergo this fibrous degeneration. The symptoms that will attract your attention first are often passed over as almost valueless. The patient has more or less vertigo, thumping of the heart when he lies down to sleep, the hands and feet fall asleep easily; there is some ringing in the ears. If we are watchful we will notice that some one organ is perhaps more influenced than another, and in these particular instances we sometimes will diagnose the trouble as Bright's disease simply because we have some albumen in the urine and some casts, when it ought to be diagnosed as a general fibrosis. If we want to continue the name "Bright's disease" it should cover the whole of these conditions, as they appear in every organ of the body. We will find that 90 per cent. of these patients are drunkards or gluttons, and here is the beginning of this condition. The practice that I follow out is to reduce the quantity of food and drink down to a point where they can live a physiological life. It doesn't mean any one particular article of food, but it means a reduction in the amount. As the essayist says, there is not much in drugs for this condition. Continue the low diet until you have conquered the difficulty. This fibrous condition overwhelms the cell structures, destroying the cell but leaving the nuclei. If the nucleus is alive the cell

can reproduce itself, and that is the tendency of every fibrous overgrowth—to be taken up, absorbed by the general forces of the body, and we have new cell structure in the place where the old has been crowded out. I know this can be done, and that is the only course of treatment I have ever discovered to do any good. Otherwise they continue their downward course. It is not rapid; it takes years to do it; but these are the patients who, when they are young, become senile. It is really pemature senility.

Dr. C. S. Bond, of Richmond: Dr. Buchman has certainly called attention to the important point in this general discussion. We are discussing now two apparently distinct diseases—nephritis and general arteriosclerosis. They can not be separated. We should have either the one name or the other. The terminal manifestation of the disease is nephritis; the general disease is a deterioration of the cells along with the intima of the blood vessels. Why do these cells proliferate? These people ordinarily are good eaters, or, what amounts to the same thing, live under high mental and physical tension, making arterial tension. With the light eaters it amounts to the same thing. They do not digest their food properly. The starches and sugars are not properly converted and carbonic acid gas forms. This acid which circulates through the cells of the body incites proliferation, and, because of the irritation, spasm of the arterioles is caused. The outcome in these cases will be that sooner or later a small quantity of urea is passed from the kidneys because of this spasm of the arterioles. It is a practice of mine not to examine for albumen and casts, but to examine the amount of waste present in the urine. If the amount of waste be small over a great many days, if it is a constant factor, one may be sure there is occlusion in the small arterioles. After a while there is a proliferation of the cells in the kidneys themselves and then we have the phenomena of nephritis. I desire to emphasize this point, that by careful diagnosis, by careful estimates of the waste in the urine for a long time, one can eliminate these cases and put them on the road to getting better before they get nephritis. When the kidneys are damaged we can not do more

than ameliorate the disease. I have watched these cases pass from one point to another, examining the urine every few days for a month at a time, and in time they were passing albumen and had evident chronic interstitial nephritis.

Dr. W. T. S. Dodds, of Indianapolis: This question of the examination of urine is a very important one. Acids—nitric, hypdrochloric and acetic—will dissolve small quantities of albumen. We may have a chronic interstitial nephritis or a chronic irritation of the kidney with albumen in small quantities which these acids will dissolve. An examination of the urine, to be of the greatest value, must be a microscopical examination to determine the number of cells and casts and general debris which passes through the kidney. That, with an estimation of the urea, is the proper kind of an examination. It is easy to find albumen, but after you have found it alone you don't know whether you have an interstitial nephritis, a parenchymatous nephritis or an arteriosclerosis.

Dr. S. P. Scherer, of Indianapolis: We should make no distinction between structural changes in the arterial system in any portion of the organism. The controlling factor is the dietetic treatment or the prophylaxis of this condition by the proper feeding of the individual. The patients do not come under our observation until they think they need medical attention. At that time structural change has already taken place. The chemical examination of the urine and the microscopical examination are important factors in making a positive diagnosis. The prime causes of this trouble are in the digestive system, the habits of life of the patient, excesses of all kinds—alcohol, smoking, venery and all sorts of abuses. The general consensus of opinion is that it is the proteid group of foods which cause this condition. The utilization of this complex proteid molecule in the body and the elimination of its resultant products acts as an irritating factor on the walls of the blood vessel itself, thereby producing the destructive metamorphosis that has already been referred to. The cell can take only certain portions of any one group of foods. When it is taken in amounts more than sufficient to maintain

body metabolism it acts then as an irritant to the cellular system, in the digestive tract and the cells of the blood vessels, and fibrosis results. So the dietetic treatment of arteriosclerosis is of very great interest to all of us and should be more thoroughly understood than it is.

Dr. F. B. Wynn, of Indianapolis: It seems to me we are a little apt to overlook some very important etiological factors in the causation of this condition. To be sure, we recognize alcohol as a prime factor, and afterwards syphilis, and also the dietetic factors to which Dr. Scherer has referred. The teaching I had when a medical student is still applicable to this condition. It is still true that increased arterial tension as it occurs in the man who is doing hard labor will produce arteriosclerosis. We know that prize fighters are subject to this condition. In a few years they have this sclerotic process going on in their vessels and they break down. In school athletes this is also true. The workingman who works hard on the streets gets as old at fifty as he should be at sixty or seventy. It is simply the mechanical idea, the strain to which the physical system is subjected. How are we going to treat these cases? We can say to the college athlete, "You have passed your limit of elasticity; you will develop arteriosclerosis." We can say to the workingman, "If possible don't work quite so hard." Another thing is the way we live—all people who overwork. I think this applies especially to our profession. We see the doctor getting old at forty or forty-five under stress of business. That is through nervous influence. How often the neurologists note in chronic neurasthenia the tendency to arteriosclerosis. Nervous influences may act to produce this condition, but, on the other hand, it is partly mechanical. These are the cases we can do something for in the way of treatment. Your alcoholic and syphilitic cases you can not do much for, but in those cases in which there is over-nervous activity, over-physical activity, you can do something. Tell them to go a little slow. I have observed no less than three or four members of the State Association who are working too hard. They ought to take more sleep and more vacations. They ought to go to the meetings of the

American Medical Association, attend the State Medical Association, or take a month's vacation once in a while. I don't believe they will be losers. They may thus avoid arteriosclerosis.

Dr. Guido Bell, of Indianapolis: The idea has been expressed that arteriosclerosis is a disorder of the whole system, but now our pathologists say it is sometimes a local disorder. I was waiting for one of the specialists to mention that. At the last meeting of the gynecologists in Europe this question was an important one. Sometimes they have hemorrhage from the sexual organs in their operations and can not account for it, and if they verify their diagnosis by postmortem they find arteriosclerosis in the vessels of the womb, in the artery of the ovary, and so on—a local arteriosclerosis. The causation is not known, but I call your attention to the fact that the old idea that it is a general condition has to be modified somewhat, and the regulation of the nutrition can not therefore be always a successful treatment of this disease.

Dr. A. C. Kimberlin, of Indianapolis: I did not expect to cover this subject fully, but only attempted to tell you of the one form commonly called capillary or arteriofibrosis. In the etiology syphilis and dissipation are well recognized causes, but it remains a fact that there are a great many patients who are types of this capillary form of fibrosis, and we find that the ailment lies in a disturbed metabolism most generally due to disturbed circulation. Regardless of the etiological factors we do find something about persons that we can not describe that predispose them to this early degeneration; heredity surely is first among the causes. I call to mind a family in whom I treated one that died eventually of a supposed degenerative disease of the kidney at the age of forty-eight. His brother told me there had never been a male member in the family that lived to be fifty. This man's son had appendicitis. He was operated on and promptly died. A younger son of this man I now have as a patient, and might be included in this hereditary group, but four weeks ago he was infected with syphilis. He is only twenty-two, and his arteries are not healthy. This family, while educated and people of means, are inclined

to be dissipated. They do not seem to control themselves well. One sister has a diarrhœa; another has a tendency to "spells," hard to describe; another is addicted to morphine, and so on, and yet they are educated people although they lack resistance and control. There must be some explanation of such degenerative conditions.

There were one or two remarks made in regard to the impossibility of recognizing this disease until all the tissues and organs are involved. There are clinical symptoms that can be relied on just as surely as those ascertained microscopically and chemically. Laborers, to be sure, are given to a certain form of arteriosclerosis, and one characteristic is the extreme engorgement of the superficial veins. These cases come to us regularly; they come repeatedly, without our being able to satisfy them or give them relief. Doctors are the first offenders against themselves in this, as we all know, and when I see how many doctors succumb to Bright's disease, and how few physicians with gray hairs there are among us, it is painful to me.

PRESERVATION OF THE PERINEUM IN OCCIPITO-POSTERIOR PRESENTATIONS.

BY EWARD J. M'OSCAR, M.D., OF FORT WAYNE.

This paper is presented to advance a single point, viz., the delivery of that most difficult class of presentations with preservation of the pelvic floor.

The frequent occurrence of perineal rupture during labor, especially in primipara, has led physicians and laity alike to regard such injury as an unfortunate occurrence which is necessarily one of the penalties of childbearing.

That the condition is not infrequent, the numerous operations which gynecologists are called on to make give ample testimony. The still greater number who bear their sufferings for years without accepting relief but add to the evidence.

The process of labor is physiological. Undoubtedly it was designed to be accomplished and still maintain the function of parts which it calls into action.

In the normal positions of the head much may properly be left to nature to perform, and the attendant has little else to do than to contemplate her ways and marvel at her accomplishments. In abnormal positions he should none the less recognize these and direct his efforts in accord therewith. Just so far as he disregards and runs counter to physiological aids will disaster to some degree follow in his wake.

In the occipito-posterior position, unless the child is diminutive, an effort should be made to change the position to the normal. This may be undertaken with reasonable assurance of success if the position is recognized before the head is well engaged in the pelvis. When the latter condition has obtained, the best directed efforts, even with the patient under complete anesthesia, will sometimes fail to accomplish the result.

Delivery must then be made, the position of the head favoring the greatest possible injury to the pelvic floor.

The successful management under such unfavorable conditions with a minimum destruction of the relation of the soft parts is a consummation devoutly to be wished, and the writer has reason to believe is more often obtainable than is generally taught and frequently experienced.

Many physicians who have had painful experiences with these positions assert that in many, perhaps in most cases presenting occiput-posteriorly, the destruction of the pelvic floor is well-nigh inevitable. To minimize such evil result and the better to facilitate repair, an able member of this society has suggested that the perineum be incised, and thus prevent the ragged wound resulting from violence to be produced by the oncoming head. If it be true that perineal rupture is inevitable, this procedure of incising the perineum would no doubt better the resulting condition after labor, and accordingly would merit consideration.

But many supposed inevitable tears are avoidable. There is a latent and unused elasticity of the perineum which is almost beyond comprehension until actually seen and realized.

It was when confronted by a bulging perineum with occiput-posterior in a chubby nineteen-year-old primipara of short stature that the writer had this truth clearly demonstrated. With perineum stretched to its apparent limit, the marginal line of marble whiteness, and it might almost be said of marble denseness, hugging a head the larger portion of which was a waiting claimant for space through which to make its exit, it was self-evident that the tear must be wide and deep. Yet after an hour or more the child was delivered without producing what could properly be called a laceration in the sense that it would require repair.

Enormous swelling followed the prolonged pressure and stretching of the tissue, which gradually resumed the normal when sufficient time had elapsed.

There existed the looked for separations on the mucous surface, while the skin margin and deep structures remained intact.

Since the above case nine additional have occurred in the prac-

tice of the writer, making a total of ten occipito-posterior presentations during the past eighteen months. Four were primipara, six were multipara. In one, a multipara, the child was below medium size, and did not unduly tax the outlet.

The others fully verified what the first case demonstrated, viz., that the pelvic floor and vaginal outlet is possessed of an elasticity commensurate with the requirements in unusual conditions. In one case, a primipara, there was a tear at the fourchet, which should have been avoided had the time for gradual stretching been sufficiently prolonged.

Laceration of the perineum is preventable and should be a rare occurrence if due care is exercised. It should not occur at all in normal presentations, with normal anatomical conditions.

The rapid delivery of a head through an unrelaxed perineum, whether by expulsive power of the patient or by artificial aid, means certain rupture.

The slow delivery of the head, the progress of which is controlled by the receding perineum, means that relaxation will be finally complete and the perineum will measure the circumference of the head and will remain intact. It would probably be difficult to form a definite conclusion as to the full stretching properties of the perineum, but nature is wise and generous in her provisions, and probably has placed no real barrier to the proper egress of legitimate passage through this exit.

Whatever, then, finds its way through the muscle-lined, bony pelvis should pass the completely relaxed perineum without putting it asunder. The judicious and sufficient administration of chloroform throughout this last stage of labor is an essential part of the successful management, and very materially contributes to the accomplishment of complete relaxation.

DISCUSSION.

Dr. Louis Burckhardt, of Indianapolis: Occipito-posterior presentations which last to the end of delivery, with the occiput coming down on the perineum, are rather rare, and ten of such cases in the practice of one physician in eighteen months is an unusual experience. There is a great difference between cases of right

occipito-posterior presentations and left occipito-posterior positions. Right occipito-posterior presentations will almost invariably in the course of labor turn forward and end as right anterior presentations. It is my experience also that more than half of the right anterior occipital presentations begin as right posterior occipital presentations. I would therefore hesitate a long time before I would try to perform occipital version by trying to turn the head from right occipito-posterior to right anterior. However, it is different with left posterior positions. The occiput will come down on the perineum and the sinciput will have to be brought under the symphysis. I fully agree with Dr. McOscar that we ought to permit the perineum to be stretched in the natural way. If you would like to get good relaxation without tearing, do away with the vaginal douche, because by that means we do away with the natural lubricant which is so essential to satisfactory stretching of the soft parts.

In my last two cases of left occipito-posterior presentations I used a method that helped me somewhat. I did not permit the child to be born in the antero-posterior diameter, but in the left oblique diameter. I had the saggital suture in the left oblique diameter. I got the left parietal bone to descend first, and then the right parietal bone, which was nearer the symphysis, was born afterward. You will notice if you deliver the head in occipito-posterior presentations in the oblique diameter—for instance, if you try the forceps and turn the head over a little—you will succeed in saving the perineum.

The suggestion made by another gentleman in your society about incision is a good one. Healing takes place better after an incision than after a laceration. Such tears, as a rule, only heal with the secondary suture, not with the primary suture.

Dr. E. D. Moffett, of Indianapolis: The greatest difficulty I have had with cases of this kind has been with the head entering the superior strait. The woman with her auxiliary muscles is not able to assist the uterus in its action. I have been called in consultation in a number of these cases. I find that most of the cases are left until the woman is completely exhausted. Then it be-

comes our duty to apply the forceps, and invariably I have applied the forceps and brought the head down, and then have taken the forceps off when the head presented at the perineum. I assist in stretching the perineum by gradual pressure upon the perineum. I have had very slight tears, and in a few cases I have had no tear at all. But I wish to take exception to the essayist when he says he is able to deliver these cases without even the fourchet being torn.

Dr. B. Van Sweringen, of Fort Wayne: It is a matter of some surprise to me to find that the text-books upon obstetrics state that the occurrence of these cases is so rare. I have had the same trouble as mentioned by Dr. Moffett, that the first stage is unduly prolonged and the head has not come down into the superior strait. I have in mind one instance in which the practitioner was imbued with the idea of waiting to such an extent that he allowed the case to go for five days before any attempt was made to deliver. I do not approve of this policy of waiting in left occiput-posterior cases; it is useless, though I am not in accord with the conclusions of the paper that it is possible to deliver all of these babies without laceration of the perineum. I know of no class of cases that give me as much trouble as these persistent occipito-posterior positions, and, having had a number of them that proved disastrous to the child, I have attempted to resort to podalic version very early.

Dr. W. H. Wishard, of Indianapolis: The average woman is delivered with the limbs flexed upon the abdomen, and in such cases as those spoken of here this afternoon I have invariably, to save the perineum, straightened the limbs down and brought them as close together as I could and successfully manipulate the delivery of the child and I have never had very much laceration.

Dr. P. C. Holland, of Bloomington: In posterior vertex presentations it is quite difficult to recognize them early. Many times the head is low before we recognize them. Many of them are premature deliveries and my experience is that it is very dangerous to the child. So far as rupture is concerned, I don't believe I remember any serious rupture without interference.

Dr. E. J. McOscar, of Fort Wayne: As to the unusual number of these cases. During the previous twenty years that I practiced medicine I don't know how many cases I had. They were rare. I reported the first case to our society, and since then there are nine additional cases reported. I have not taken note of them myself alone, but I have called upon the nurse or members of the family to observe the case. I would not go out and report them without having the evidence at hand. There is no question about these being *bona fide* occiput-posterior presentations. It does not make much difference whether the presentation is right or left; the head is coming down and in the last stage if the occiput is posterior it must come through the perineum, and if we can prove to ourselves and the patient that it can be delivered without destroying the pelvic floor that takes in the whole category of head deliveries. The shoulders give trouble sometimes, but nevertheless there are a large number of these cases that are up to the head, and in posterior positions when there is a rupture they are produced by the head. The waiting position is not a good one. The man who stands by for five days has not been at work at all. The last stage is not on. So that the waiting process of five days or five hours does no good for that particular woman. But the obstetrician can do the most for the woman when the labor is well advanced, when the head is ready to tear through the tissues, when he is there to make the uterus wait until there is sufficient relaxation of the perineum. It is not a matter of theory with me. When I was in school and afterward in practice under experienced men of great reputations I was told that in every case of this kind we would have a rupture into the rectum and it could not be helped. When I believed in the gentlemen who taught that these heads could not be delivered without a rupture of the perineum I had ruptured perineum. I have quit it. It is a calamity, and a serious one to the patient. Think of any rupture upon yourself that would involve anything so disastrous as this is to the woman and take it home to yourself. It will be a disgrace sometime to every physician that has one.

SYPHILIS CONSIDERED AS A NONVENEREAL DISEASE.

BY NELSON D. BRAYTON, A.M., M.D., OF INDIANAPOLIS.

The evident fact is already known to the profession in a general way that syphilis is not always a venereal disease; that is, it is not always acquired from impure sexual intercourse. The relative frequency of the different modes of its infection is perhaps not so well known, nor is the proportionate frequency of the geographical situation of the ofttimes extragenital lesions; and while syphilis still stands as it has for ages as pre-eminently a venereal disease, the records of the past are full of facts and literature showing that dozens of epidemics involving thousands of individuals, even whole races of people, have occurred among those who have acquired the disease ignorantly or at least ignorant of its dangers. These ways and methods of its contagion and infection are so wide and varied that they may hardly even have been expected, and yet the disease has been acquired in a perfectly innocent and blameless manner. Fournier declares that over one-fourth of all his female patients were victims of innocent syphilis. Ricord, in the discussion of his paper on the subject, reports that his experience fully corroborates the statement of Fournier.

The larger proportion of cases of syphilis insontium occurs in females, but that the disease is not infrequently acquired by males in a blameless manner is abundantly shown in the reports of thousands of cases. In many cases of reported syphilis the exact method of the manner of contagion remains in doubt; and it is altogether likely that the proportion of innocent cases is even larger than most syphilologers are able to prove by their records or reports.

Topographical Distribution of the Lesion.—The majority of these cases of extragenital chancres appears on the face or its

cavities and the lips. Next to the genital region, the face is the favorite seat of election for the syphilitic chancre. The lips are most often the seat of the lesion; then the tonsils, tongue, the cheek, the eye, the ear and nose in the order named. Greater relative frequency occurs in chancres of the fingers than that of the tongue or breast, and aside from these regions the chancre may and does appear in any region of the body—a matter which is not of very extraordinary uncommon dermatologic observation. It is to Bulkley that we owe, perhaps, our most detailed knowledge of innocent syphilis, and his work upon this subject, "Syphilis Insontium," has become a medical classic in every land. Its most valuable feature is the detail with which he has elaborated the unusual methods.

Based upon a series of nearly two hundred cases, which he has observed, of acquiring the disease, Bulkley makes the general classification as follows:

1. Syphilis economica, when in the ordinary relations of domestic and industrial life the disease is transmitted, innocently, from one person to another.

2. Syphilis brephotrophica, in which the disease is acquired by or from infants, in connection with their nourishment and care; and

3. Syphilis technica, where the opportunities for the conveyance of the poison occur in connection with various forms of body service—medical or surgical—or like nature.

More in detail, these may be elaborated as follows:

In syphilis economica we have to deal with three main groups—those of domestic transmission, industrial transmission and personal transmision. Domestic transmission includes all those cases reported as having been conveyed by means of spoons, knives, forks, cups, glasses, jugs, tobacco pipes, cigars, bottles, etc.

A case of this kind was a frequent visitor to the Bobbs Dispensary clinic two years ago in my service—a patient in whom the poison was undoubtedly conveyed by a bottle—the bottle being a beer bottle, the contents of which the individual partook in company with a number of fellow workmen at dinner. This man, Mr. X, colored, was a married man, father of four children, and

had a well-developed chancre of the upper lip. When first seen this chancre was as large as one's thumb nail. He had pain and tenderness on deglutition, especially near the ear, and marked

adenopathy on both sides of the throat. In his subsequent luetic history he developed a persistent leucoplasia on the tongue, which was a subject of continued interest among the students.

Various articles of personal apparel, such as underwear, drawers, shirts, handkerchiefs, etc., may also convey the poison, and my attention was called to a recent case of syphilis in which a washerwoman was infected on the hand. The lesion was probably acquired from washing the underwear of an infected person who was an inmate of the house in which she was employed.

In addition to wearing apparel, cases are on record where the poison has been conveyed by means of bedding, bedclothes and toilet articles, sponges, combs, toothbrushes, syringes, pocket knives and similar articles.

2. Industrial transmission—syphilis of the trades, arts and crafts. This includes a wide and varied group of cases, the most notable and striking method being that of glass blowers. By their trade in the manufacture of glass the glass blowers are compelled to use different tubes to blow the glass. The promiscuous use of these tubes has resulted in widespread epidemics, in earlier times, of syphilis among glass blowers, and whole communities have been quickly syphilized. In one epidemic in France there are listed 162 cases of innocent syphilis, all attributed to glass blowers and acquired from mouth chancres—innocently and blamelessly obtained. This industrial contagion has been one of the most interesting things in connection with the history of syphilis and has been made all the more so because, on account of sanitary

laws, such opportunities for the transmission of its contagion have been reduced to a minimum. Indeed, the courts have decided that the employe has legal redress against his employer in cases of industrial contagion, French courts recently holding that an employer may be responsible for damages in case of the transmission of syphilis by the intermediation of a professional instrument.

Assayers, goldsmiths, weavers, etc., are also liable to infection through instruments used with the mouth in their respective trades. Musicians have acquired the disease through their instruments, and car conductors from borrowing the whistle from a syphilitic friend. Pens, pencils or paper cutters may also transmit the poison.

Among the rarer forms of its transmission and belonging to this group may be mentioned the transfer of the poison by means of stick candy. Some years ago it fell to my lot to observe two &instances of this kind. The syphilized individuals were both children, brother and sister, aged 4 and 6, respectively. Both were suffering from mouth lesions and both had acquired the disease from sucking candy—stick taffy candy—obtained from neighbors' children. These two cases were observed in the clinic of Dr. J. A. Fordyce, of New York City, and were observed by me at a time when I was doing work in the Bellevue Dispensary.

Personal Transmission.—This subject covers only a few varieties, but includes those innumerable cases where the poison is acquired by kissing, biting and doing other nonvenereal acts. Next to the venereal act itself, kissing probably now affords a larger proportion of syphilitics than any other mode of transmission, and hundreds of instances from this cause may be found reported. A special pathos ofttimes attaches itself to these chancres of the lip and mouth cases, inasmuch as many of them are acquired by girls, young and innocent of wrongdoing, kissing, or being kissed by their perfidious lovers. Again it may be conveyed by the innocent syphilized, a case of which I may now report.

Miss X was a nurse in the children's ward of the Skin and Cancer Hospital, New York. There were no cases of syphilis in

the hospital among the employes and none in the ward of children of which she had charge. She consulted me for a sore throat during my service as house surgeon, and I prescribed accordingly, without looking at her throat. She showed no improvement in a week, and left on a vacation. In a month she returned with syphilitic roseola. This time she received proper treatment and under protoiodide, gr. ¼, t. i. d., her rash and throat symptoms subsided. Although I had noticed a left-sided cervical adenopathy, my suspicions were not aroused at the time that she might have a tonsiliar chancre.

Upon closely examining her I found that she had kissed a friend of hers about three weeks previous to the development of the throat symptoms, and there is no doubt in my mind that this was the source of her infection, as I at once recalled the fact that this friend was an independent patient of the outdoor department of the hospital, and was even then on specific treatment. This woman was also an innocent victim, having been previously syphilized by her husband.

Another tonsiliar chancre was that of a young man, a Dr. C., who was a senior student at the College of Physicians and Surgeons, of New York City, where the nature of his trouble was entirely overlooked by the counsel whom he asked for advice for his throat, and the diagnosis of which was first made at the Skin and Cancer Clinic. This recalls a similar instance of a chancre of the lip on a medical student whom I saw within the present year and which was twice unrecognized and twice undiagnosed by members of the faculty of the school which he attended. This chancre was probably obtained while kissing.

Scratching or biting may give rise to initial lesions, if occurring from a syphilitic. Taylor, in his treatise on Venereal Diseases, records a series of cases where the entire family were all made victims of innocent syphilis, the first child having been infected by a chancre on the heel, probably from scratching its mother's vulva while sleeping in the same bed with her at night.

Syphilis Brephotrophica.—Two divisions are met with here. First, that relating to the nutrition of infants, and secondly, that relating to attendance upon them. Chancre of the breast may

occur through many causes. Thus, the mother may receive the chancre from nursing her own syphilitic child, syphilized either by its father, by some wet nurse or through other causes; or the mother herself may become syphilized and then syphilize her suckling child. The hand-feeding of infants—feeding bottles, sugar teats, pacifiers, spoons, cups, sponges, combs and napkins, may also be agencies in syphilizing the child.

Syphilis Technica.—This third main class which we now consider comprises that large group of cases in connection with various forms of body service, the medical and surgical, and nurses and attendants on those affected.

In this group are three divisions:

1. Where the operator is the victim.
2. Where the operator is the syphilifer.
3. Where the operator is the medium.

The last group is one of intense interest to the profession, as unfortunately it not infrequently happens that a physician or dentist may be the syphilifer only as the medium, and thus injure and innoculate his innocent patient.

Instances of the first group are all too frequent among our profession, and too many of our hard-working brethren have been innocently syphilized. In my own experience I know eight physicians who have had digital chancres, obtained in their professional calling. My father, Dr. A. W. Brayton, reports some twenty who have called upon him in consultation, the victims of innocent syphilis.

The poison may be received during operation, even by anatomists or in postmortem dissection; in manipulative procedures as by students or practitioners in venereal clinics. Dentists are also infected while practicing their profession. The largest number of these cases are, of course, among the gynecologists and accoucheurs. Within the present year I have seen a prominent gynecologist with a large, malignant chancre on his finger, acquired while examining a female patient. A case has been related to me but recently of a nurse who had a chancre of the eye, received while doing dressings for an infected infant. Among the Hebrew

rabbis, cases have been reported of syphilis insontium of the mouth, acquired by sucking the penis to stop the flow of blood after circumcision.

When the operator is the syphilifer. In this instance, the operator, having syphilis, communicates his own disease to another by means of some body service. We have already seen that accoucheurs and gynecologists may easily and readily acquire syphilis in their line of duty. They may just as easily transmit it. Instances are on record where epidemics have occurred in France and at least one hundred people infected by the midwife. In England, an epidemic is reported where one midwife infected, directly or indirectly, at least thirty married women, nine husbands and two infants. Professional breast-drawers are also prolific sources of contagion, and the less common practice of this art in this country and the higher education and intelligence of the masses accounts for the striking rarity of reports of cases of infection by this method in this country as compared with the peasantry of Europe. Among the curious and unexpected methods, however, should be mentioned the ancient practice of removing foreign bodies by the tongue from the eye. Thus in Persia, in a small town of five hundred and fifty people, over one-half this number were infected by a quack who professed her ability to remove foreign bodies, smooth granular lids and cure trachoma by licking the lids with her tongue. In this manner over one-half the population of the village were rendered diseased.

Tattooing and sucking of recent wounds are also causes of extragenital chancres.

When the operator is the medium. Among these cases transmitted are some of the saddest cases in medical history. Infrequently, it is true, but nevertheless with certainty, does it occur that the physician or dentist may be the syphilifer through the medium of his instruments. Again, to a case within the present year; my attention was called in the instance of a young lady of the best rank with a chancre of the tonsil. In this instance, the attending physician, worrying about the possibility of his having conveyed to his patient the poison of this disease, while treating her throat for simple ulceration, called up the office by

telephone to make inquiry if she had really contracted the disease. The sad truth compelled its admission.

Among the other methods of transmitting the infection may be mentioned vaccination, dentistry, wet cupping and razors; tongue depressors and surgical sounds and speculae are accredited with being frequently, especially in preaseptic days, the commonest carriers of infection. In the case of a celebrated ear specialist of Paris, no less than twenty cases were traced to eustachian catheterization. Other more scattered cases of odd acquisition could of course, be related, but would only needlessly extend the length of this paper.

Diagnosis. Upon the buccal mucous membranes the diagnosis of the extragenital chancre presents certain peculiar characteristics. On account of varying conditions of secretion, motility, and digestion the chancre may partake of a changed appearance from that of other regions. This is not always the case, as the main diagnostic features of the Hunterian lesion remain the same—an ulcer with infiltration, nonautoinoculability and sclerous involvement of surrounding lymph glands—this is the trinity of symptoms on which we base our diagnosis. In addition, we have chronicity of the lesion to confirm our suspicions and the natural train of secondary symptoms which follows the wake of primary syphilis.

Upon the lip and mouth, cheek or tongue, we have often present a pseudo-diphtheritic membrane, resistant to removal. This membrane upon a raised ulcer, or at or near its base upon a mucous membrane, is to me almost pathognomic of the nature of the lesion.

Chancres of the mouth and face must be diagnosed from epithelioma, gumma, diphtheria, simple ulcers and tuberculous growths, but if one bears in mind that wherever it may be located a single circumscribed ulcer upon a hard infiltrated bed on any surface, whether integumental or mucous membrane, if chronic in duration, points commonly to either chancre or epithelioma; and if this be borne in mind, a diagnosis is always easily reached. It is by overlooking the fact that a chancre is not necessarily a genital and venereal lesion that mistakes are often due, and as a rule,

when this fact is recognized the differentiation from other diseases and causes is rarely difficult.

Prognosis and treatment. These do not materially differ from the disease when originating in the more common region of the body. Indeed, the most difficult part of treatment will be found to display the fact with which such cases of syphilis must so often be managed and treated.

Personal experience of the writer. In my experience it has been my fortune to have seen a representative number of these cases. At the present time (November, 1903) I recall twenty-seven different cases of extragenital chancre which it has been my fortune to see. They open a field of interest to the dermatologist often in other than scientific bounds, and once seen are never forgotten.

The location of the lesions of these cases, many of which were seen at the Skin and Cancer Hospital in New York, in the service of Drs. Bulkley and Fox, and others at the City Hospital in the service of Drs. Fordyce and others in conjunction with my father, Dr. A. W. Brayton, of Indianapolis, is as follows: Face—Tonsils, 8; cheek and nose, 2; lips, 7; chin, 1; neck, 1. Fingers, 9. Abdomen, 1.

And since the above was written I have seen during the present season four more; one of these, a patient, being on the lip of a girl; two more in my skin clinic at the Medical College of Indiana, both on the lip and one a tonsillar chancre on a dentist, which appeared six weeks after exposure to a syphilitic patient.

The social, moral and medical obligations incurred from these cases. In some ways these differ from those of syphilis obtained by the other, or rather I might say, the more frequent manner. It at once becomes one of the most important in the treatment of those suffering from the disease, that he shall have as his aim the protection of other innocents against contamination. Here, as elsewhere in the practice of medicine, infinite tact must be observed by the physician in charge. The professional secret must be observed, the social standing of the client must be maintained unimpeached by warnings which may ofttimes be indirectly given to others; friends, relatives and dear ones must be safeguarded,

and finally those dangers, which so beset the afflicted individuals in the marriage or antimarriage relationships; dangers to wife; dangers to daughter; dangers to offspring; dangers to entourage and all those dangers which come from morbid irradiations of a contagious disease into family and social life; all these dangers must be combated with effective measures which will limit them and thus prevent or circumscribe their spread. This protective duty, which has for its object the preservation of the helpless and innocent from infection, devolves upon the physician in his capacity as individual and public sanitarian and guardian of the people's health. In the fulfillment and realization of this duty and responsibility, the physician attains to the highest ideals of preventive medicine. In safeguarding marriage; in safeguarding the family; in safeguarding the public, the physician becomes the protector of the wife and mother; he becomes the protector and preserver of the future citizen of the State.

In the discharge of this duty the physician will find himself confronted with many difficulties. The situations created by the introduction of a contagious disease such as syphilis into family life, are many and complicated. The problems presented by it are delicate, perplexing, intricate and difficult of solution. In dealing with these situations there is acquired not only a thorough knowledge of human nature, but a professional sagacity and conduct such as is not taught in any books or curriculum. It then behooves the physician to formulate his basis of thought and action and rules of guidance according as the varying situations may be modified by the individual case.

In the realization of this perfection, in the tact and yet sufficient plainness of instruction, in the kindliness, the gentleness and purity of thought and expression, and without incurring the risk of affront or offense, the physician in dealing with the manifold complications pertaining to the disease in question may win for himself the love and admiration of his patient as he could in no other way with any other disease, and he may succeed to that high plane of gratitude which makes him a leader and a distinctive type among men.

To me the subject of extragenital chancre, of syphilis insontium the nonvenereal origin of syphilis, opens up one of the most fascinating topics in clinical medicine, and it is only by observance of this fact—that syphilis may be nonvenereal in its origin and of blameless and innocent contagion—that many of the obscure, the perplexing, the unintelligible and distressing cases of this disorder may be classified, properly diagnosed and treated.

DISCUSSION.

Dr. J. E. Morrow, of Indianapolis: This is a careful presentation of the subject of extragenital syphilis. The writer laid stress upon the fact that it is not necessarily a venereal disease. There are many people suffering from it, and even the physicians sneer at every case that claims to be innocent of any wrongdoing. They ought to be given the benefit of the doubt and properly cautioned, and very often a family might be saved much trouble. We ought to impress upon patients the contagiousness of the disease and of the necessity of using separate knives and forks and spoons and towels. I saw a case, or a series of cases, a year and a half ago, where a man had acquired syphilis by means of a razor in a barber-shop. There was a little sore on the face and some slight eruption. His mouth and throat got sore and his mother, father and one of his children became infected, and it shows the importance of the diagnosis of these cases of extragenital chancre. If the sore on the face in this case had been diagnosed these people might have been saved from infection.

Dr. J. J. Kyle, of Indianapolis: In the treatment of syphilis, especially in the secondary and tertiary stages, we all know of the great difficulty in the administration of iodide of potassium. It so often happens that gastric disturbances arise from the use of the iodides, and in consequence of that a great many physicians have endeavored to obtain a substitute for the iodide. During the past winter I have been using, very successfully, I think, iodonucleoid, a very pleasant drug that causes no gastric disturbances and can be administered the same as the iodide of potassium.

Dr. Brayton has said it is often difficult to diagnose these cases.

To relate a case that came under my observation: A young man 27 or 28 years of age, very anæmic, exsanguinated, exhausted, with some slight disturbance of his memory as the result of total occlusion of the nostril on one side. There was a pendulous tumor hanging from the meatus of the nose. I thought at first it must be angiosarcoma, because every time I touched the growth there was quite a venous hemorrhage. The doctor who sent the case also thought it was a sarcoma. There was no glandular infiltration and no metastatic infiltration that I could discover. We thought to stop the hemorrhage by plugging the postnasal space enough to snare the growth, but we couldn't get the snare around it. I removed it with the scissors from the septum, and after breaking up some of the adhesions I still found there were adhesions along the outer portion of the nose along the middle turbinate and tried to get it away with the scissors. On removing the tumor it broke down into granular masses, so I cureted it away and also removed the middle turbinate, opening up into the ethmoid and sphenoid sinuses. I was still in doubt about the tumor and sent it to the pathologist, who reported it as having a granular structure, and I then diagnosed it as a syphilitic granuloma and put him on mercury and iodonucleoid, and I have no doubt he will make a good recovery.

Dr. A. W. Brayton, of Indianapolis: I received a couple of ounces of the iodonucleoid and gave it to the druggist with instructions to give it to any one asking for it, because I have not the courage in any case needing the iodide of potash to substitute any other drug. Still some one has to make these experiments with the new combinations, or our therapy would not progress. But it does seem to me that any one who follows the sunny pages of Gowers—these essays of his published in the past few weeks devoted in part to the diagnosis of cerebral syphilis and the treatment of it and the parasyphilitic affections that are the results of syphilis—would feel some hesitancy in employing iodine in any other form than the iodide of potash. It is one of the great gifts of the last century to our therapy. Only about sixty years ago it was observed that burnt sponge seemed to help goitre; then it

was found there was iodine in it, and then physicians began to use the iodide of potash empirically. Other nodes began to melt away with its use, and notably syphilitic nodes. And so that drug which Keyes says brings us nearer to the omnipotence of the Deity than any other drug which we use, was brought to our attention and it is certainly one of the great therapeutic discoveries of the last century. These experiments with other combinations of iodine ought to be made in the hospitals, where everything is favorable for scientific experiment.

One more word. I would recommend to any reading doctor the charming work of Morrow on "Social Diseases and Marriage." It is thirty years ago that Prince Morrow translated the epoch-making work of Fournier, "Syphilis and Marriage." That was followed six or seven years after—in 1879—by the discovery of the gonococcus by Neisser, and in 1889 by the charming book of Jullien's on "Libertinism and Marriage." Now Morrow, with over 40 years' experience in New York, has brought all the work of later times and the later knowledge in relation to syphilis and gonorrhœa to marriage and the social state into one book. It only costs two or three dollars and is a valuable addition to the physician's library.

We have in syphilis a great subject of study. Osler says that if students are well grounded in tuberculosis, typhoid fever, pneumonia and syphilis that most of the other subjects will care for themselves. It seems to me as we progress and see these awful diseases permeating every part of our nature—social, physical and moral—that we can not know too much of them. And I commend my son for calling attention to the larger social relationships of syphilis as they are so well set forth in this work of Morrow, which I have recommended. It will prove a very helpful and useful book.

Dr. E. R. Sisson, of Maxwell: I find that you can do away with the unpleasant symptoms produced by potassium iodide by giving it in the essence of pepsin. You can increase the dose faster and get results quicker without the gastric disturbances and iodism.

Dr. A. E. Sterne, of Indianapolis: In regard to the use of the iodides, it seems to me that we might break away from the iodide of potassium. It is the iodine that does the work. Why unite it with a harmful base? The iodide of soda is much safer, in large doses especially. In nerve syphilis, where we use as much as 1,000 grains daily, we never use iodide of potash. Another thing about iodism. If you will stop the dose for 24 hours and then jump to the large doses they will take it all right. We do not know the reason of this. Calomel is another drug of this sort. I have used for weeks at a time over a thousand grains daily of the iodide of soda. In general practice, where the iodides are extremely expensive, tincture of iodine may be given in doses of five drops well diluted and increasing up to fifteen or twenty drops, or given in small doses six, eight or ten times a day. It has a wonderful effect.

Dr. N. D. Brayton, of Indianapolis: I wish to thank the members for this discussion, but permit me in closing to say a few words as regards the breaking away from the use of the iodide of potash and the substitution of iodonucleoid, syrup of hydriodic acid, or these thousand and one things which the proprietary druggists get out now-a-days, place upon the market, and ask the doctors to try, to buy, and to experiment with. In medicine I believe we learn best from clinical experience, and it behooves us to use this knowledge for the best interest of our patients. Now, in tertiary, as in brain syphilis, we know from the experience of the last sixty years the crying need of the iodide of potassium administered in heroic dosage. By this I mean as much as 300 grains a day and upwards. The intelligent members of our profession have challenged all proprietary remedies and combinations which have been offered as substitutes and have so far reverted to the original iodide of potassium, and I doubt that there will be any exception in the case of the iodonucleoids. Certainly nothing has been so irrevocably proven in medicine as the necessity of the iodide of potassium for the explosive effects of tertiary syphilis.

DIAGNOSTIC VALUE OF LEUCOCYTOSIS.

BY G. W. M'CASKEY, M. D., OF FORT WAYNE.

The remarkably large fluctuation in the number of leucocytes circulating in the peripheral blood constitute one of the most intensely interesting of hematologic phenomena. The relationship of these changes to different morbid processes has been the subject of the most extensive clinical and experimental study with the view, among other things, of establishing working diagnostic and prognostic formulæ. This indeed was done, but with more haste than discrimination, and without due regard to the anatomicophysiologic foundation upon which it ought to rest. Growing out of the resulting disappointment, and with a similar disregard of the fundamental facts above referred to, there has been in certain directions a distinct tendency to greatly depreciate or even reject the phenomena of leucocytosis as a substantial clinical aid. It must be admitted that the variations in the number of leucocytes show some extraordinarily bizarre tendencies which make it difficult or even impossible to formulate rigid and inflexible rules. This, however, is also true of the temperature and pulse curves, to which are nevertheless assigned a high value. A careful study of the phenomena of leucocytosis in its physiologic relations will, I am fully convinced, lead to a similar conclusion with reference to the legitimate significance and value of variations in the leucocyte count.

While the purpose of this article is a purely clinical one, with special reference to diagnosis, it seems advisable for the reasons above given to enter into a preliminary discussion, necessarily in the barest outline, of the data upon which leucocytotic diagnosis rests.

Morphologically there can be recognized several different kinds of leucocytes distinguished by marked characteristics, such as

size of cell, size and shape of nucleus and presence or absence of granules in the cytoplasm and the tinctorial reactions of the different elements which go to make up the cell, especially when subjected to the action of aniline dyes.

For the purpose of this discussion the different forms of leucocytes may be briefly summarized as follows: First, the predominant type of cell known as the polynuclear neutrophile, which may be described as a spherical mass of protoplasm 7 to 12 u. in diameter; the cytoplasm, containing a greater or less number of rather small granules which are neither exclusively acidophile nor basophile, and are therefore called neutrophile; the nucleus, characterized by a peculiarly irregular form frequently made up of broken masses connected by fine filaments, the latter often being severed, thus resulting in several nuclei. Second, in numerical importance, the small lymphocyte, a cell from 6 to 9 u. in diameter, the cytoplasm free from granules and containing a small round nucleus which nearly fills the entire cell. Third, the large lymphocyte, 10 to 15 u. in diameter, without granules, demonstrable by triacid and ordinary stains, but by Nocht-Romansky method, and containing a single round or ovoid nucleus relatively small in comparison with the cell and not staining deeply. Closely related to these, morphologically, are cells precisely like them excepting that the nucleus is indented, and which are therefore called a transitional form, and the large nervo nuclear leucocyte. Fourth, the eosinophile cell precisely like the polynuclear neutrophiles in every respect excepting that the granules in the cytoplasm are very much larger and have marked affinity for acid dyes, being therefore called acidophile, oxyophile or eosinophile. Fifth, mast-cells varying greatly in size from 7 to 22 u., containing coarse granules which do not stain with either acid or neutral dyes, but with a special technique by basic dyes, hence called basophiles. Sixth, and finally, a large cell 10 to 20 u. in diameter, occurring in two forms with either neutrophile or acidophile granules, and a single large round or oval nucleus, and occurring in the blood only in diseased conditions, but normally present in the bone marrow—the so-called myelocyte.

These different forms of cells are present in health in somewhat

varying proportions, about as follows: Polynuclear neutrophiles, 60 to 75 per cent.; small lymphocytes, 20 to 30 per cent.; large lymphocytes and transitional forms, 4 to 8 per cent.; eosinophiles, .5 to 5 per cent.; basophiles, usually less than .5 per cent.

Concerning the biologic character and relation of these different forms of cells, two opposing views are entertained: First, that of the Russian school following the lead of Uski, which regards the lymphocyte as the youngest cell and the other forms as representing evolutional changes incident to the age of the cell —in other words, that the neutrophile is an old lymphocyte; second, the view of Erhlich, that the lymphocytes, neutrophiles and eosinophiles have an independent origin and a complete autonomy of existence. The latter view is the one most generally accepted and the only one which the writer believes to be supported by the facts.

In the clinical study of the ordinary forms of leucocytosis, the lymphocytes, neutrophiles and eosinophiles are the ones which principally concern us, too little being known about the mast-cells to assign them an important routine clinical role for the present at least. In regard to the three groups of cells above mentioned, everything appears to indicate that they have not only a separate origin with characteristic morphology and staining reactions, but that, as would naturally be expected, their functions are widely dissimilar in character. The neutrophile is the form of cell which is especially increased in the ordinary clinical forms of leucocytosis. By an increase is meant a larger number of these cells in a definite volume of peripheral blood, brought about by various influences, some of which are understood while others are not. The discovery of the phenomenon of positive and negative chemotaxis furnishes the key to the physiology and the clinical interpretation of this type of leucocytosis. It is now well established by an overwhelming mass of clinical and experimental evidence that the introduction of certain chemical principles into the blood causes a rapid increase, perhaps usually preceded by a transient decrease in the number of these cells in the peripheral circulation. Among these are the toxins of certain organisms, such as the streptococci and the staphylococci, while others, such

as those of the tubercle bacillus, bacillus typhosus, etc., either do not produce such an increase or may possibly have a diametrically opposite effect. In order that these chemotactic influences may be manifested, it is necessary for the chemotactic substances to gain an entrance into the circulation; a point which is absolutely vital in the whole question of the diagnosis bearing of leucocytosis and the neglect of which has led to much confusion. Especially is this true in its bearing upon the absence or presence of suppuration in some part of the body. This particular question is one of the most important and most frequent in this connection, and it is just here that the most conflicting observations have been recorded. In one of my own cases, for instance, an obscure subacute localized pulmonary lesion of some sort existed, the exact nature of which was in doubt, although the history rather pointed toward an abscess. Confirmation of this view was looked for in the leucocyte count with entirely negative results, the number being quite within the normal range, neither too high nor too low. In the course of forty-eight hours after the patient entered the hospital the diagnosis was cleared up by the evacuation of an enormous pulmonary abscess into the bronchial tubes, which very nearly suffocated the patient, an excellent recovery following the spontaneous discharge of pus. It is very probable in this case that a thick, impervious, pyogenic, nonabsorbent membrane had walled in the pus from the circulation and had prevented the entrance into the circulation of the bacterial toxins which probably constitute the chemotactic substance in cases of suppuration. This same question must be kept in mind in the diagnosis of suppurative appendicitis, where perhaps more often than elsewhere the question of the existence or nonexistence of a pyogenic process presents itself for solution. If the anatomical conditions are such that the toxins can not to any great extent enter the circulation, a leucocytosis of diagnostic significance may be entirely absent. There is another feature, however, with which the diagnostician always has to deal, and that is the reactive or resistive power of the individual of which the leucocytosis is an expression. We must recognize in the occurrence of an active leucocytosis under such conditions the mar-

shaling of the defensive machinery of the organism against the invading foe. If, now, the organism is overwhelmed by the intensity of the morbid process or from pre-existing disease and lacks the ability to make an effective resistance, the leucocytosis will not appear. It also seems possible that peculiar idiosyncrasies may occur here as elsewhere.

Keeping in mind these conditions, the general proposition can be made that the presence or absence of the suppurative process is indicated with considerable certainty by the presence or absence of a neutrophile leucocytosis, if other chemotactic influence can be eliminated; but of course, like most diagnostic criteria it must be weighed and checked by all the facts in the case.

The remarkably brief time intervening between the occurrence of the morbid excitation and the development of the leucocytosis precludes the possibility of an increase in the total number of leucocytes at all commensurate with the increase found in the peripheral circulation. The only other hypothesis and the one now generally accepted is that they are in large part stored in a quiescent state in some of the internal channels of the circulation and are suddenly called forth in response to the demand for their services on the part of the organisms. It is believed by some that this storage is in the capillaries of the lungs, but Ehrlich does not hesitate to affirm that the bone marrow is the only place where such a storage can be looked for.

There appears to be no doubt that the bone marrow is the exclusive source of the neutrophile, its appearance there being first in the form of the so-called myelocyte or large mononuclear granulated cell which perhaps never wanders outside of the bone marrow into the general circulation except in morbid conditions and especially though not exclusively in myelogenous leukemia. This view of the life history of the neutrophile is established by a chain of evidence, clinical and experimental, which may be regarded as entirely conclusive and separates this cell and its progenitor, the neutrophile myelocyte, from all other forms of leucocytes by a sharply defined line of demarcation.

The eosinophile leucocyte, although not ranking next in numerical importance, will be considered here because of its close genetic

relationship and morphological similarity to the neutrophile leucocyte. Owing to the resemblance just mentioned, the eosinophile has been frequently regarded as a stage in the evolution of the neutrophile and has been commonly spoken of as its senile form. This view is not in accordance with the facts, and it may be considered as proven that eosinophile leucocytes circulate in the blood as the progeny of the eosinophile myelocytes pre-existing in the bone marrow. The behavior of the eosinophiles under physiological and pathological conditions can only be explained on this hypothesis and presupposes radical specific differences in the nature and function of the two cells. The final proof of its completely independent existence as a separate cell form is furnished by the discovery of mytosis, a regenerative phenomenon which is entirely incompatible with senescence. Moreover, under conditions which lead to an increase in the number of eosinophile cells in the peripheral circulation marked changes have been noted (as for example by Opie[1], in his recent article) in the bone marrow, including, among other things, marked increase of mytosis among the cells above described as being the progenitors of the ordinary eosinophile leucocyte. Although perhaps not conclusively settled, it seems probable that, like the neutrophile and unlike the lymphocyte, the eosinophile responds to certain chemotactic agents. Just what these influences are is known only in part, but the clinical association of eosinophilia with various forms of cutaneous disease, with trichina and intestinal parasites gives to this blood phenomenon a highly important character. It is worth noting here that a parallelism exists between the behavior of the neutrophile and eosinophile leucocytes under chemotactic influences, or at least a similarity in the respective vital conditions which produce or permit a large increase in the numbers of these respective cells. I refer to the reactionary power of the organism against invading infection. Opie has shown, for instance, that in guineapigs an intense and rapidly fatal infection with trichina causes a rapid diminution in the number of eosinophiles, while a mild or moderate infection with the same parasite leads to a more or less well-marked eosinophilia, thus indicating that the eosinophiles, like the neutrophiles, are

[1] Amer. Jour. Med. Science, March, 1904

rapidly increased or at least thrown into the circulation from the bone marrow in response to a demand on the part of the organism for their functional activities, whatever they may be. The theory of Neusser that their increase is incident to a sympathetic irritation is not now generally accepted, although the facts upon which it is based are of great interest and certainly lend support to his views, or at least to a close relationship of eosinophiles to the sympathetic. Ehrlich believes that among other things the soluble products of broken-down epithelial cells have the power of exciting positive chemotactic influences upon the eosinophiles, leading to their local accumulation around the sites of ulceration and other destructive processes. An extended discussion of these questions is not within the scope of this paper, and I will for the present leave the eosinophile cell, having endeavored to emphasize two important facts: first, that this cell is specifically distinct and separate from all other cells in its genetic, biologic and functional relations; and second, that experimental and clinical observation has shown that it responds in a peculiar manner to the influences of certain morbid agents.

With regard to the lymphocytes, their nature and origin is entirely different from that of the neutrophiles and eosinophiles. All the available evidence, experimental and clinical, points to the lymphatic apparatus as the source of these cells. It would be impossible to canvass this question fully within the scope of this paper, and only a few points can be mentioned. Clinically an increase in their number is very constantly associated with disease of the lymphatic system, and the well-known tendency of tuberculosis and syphilis to implicate the lymphatic glands is the probable explanation of the frequent occurrence of lymphocytosis in these two diseases. Possibly, also, in pertussis—another disease in which lymphoctosis is frequently noted—the explanation is found in an acute inflammatory swelling of the tracheobronchial lymphatic glands. It has further been observed that the blood which emerges from the lymphatic gland has more lymphocytes in it than when it entered, a fact which is only susceptible of explanation upon the ground of the formation of lymphocytes within the gland.

An effort has recently been made in several quarters to break down the sharp distinction heretofore supposed to exist between lymphatic and myelogenous leukemia, and incidentally between some of the different forms of leucocytes, especially because of the fact that in some of the cases changes in the bone marrow have been found. These facts do not appear to me to justify so sweeping a conclusion, and indeed they are not at all new, as Ehrlich a number of years ago recorded changes in the bone marrow in lymphatic leukemia and reported at least one case in which the bone marrow was almost entirely converted in lymphoid tissue. Among the pathological facts pointing to a very sharp distinction between the nature and function of lymphocytes and neutrophiles may be mentioned the observations of Milroy and Malcolm, who found the increase of alloxur bodies in the urine in myelogenous leukemia, but found no such increase in the lymphatic form. While much remains to be learned before the subject can be fully cleared up, it appears justifiable at present to regard the occurrence of the lymphocytes as the clinical evidence of irritative lesions of the lymphatic system.

Keeping in mind now the biologic facts above set forth in brief outline, and omitting, for the sake of conciseness and clearness of conception of the main facts, certain subordinate or obscure points such as the mast-cells, the transitional forms and the broad distinctions between the large and small lymphocytes indicated by the Nocht-Romansky method, we are ready to ask ourselves for more specific answers to the various questions concerning the significance of leucocytosis in general and the methods and precautions necessary for its proper interpretation. In a general way it may be said that there are two broad types of leucocytosis, one due to an irritative lesion of the lymphatic apparatus represented by a lymphocytosis, the other due to chemotactic influences and represented by a neutrophile or eosinophile leucocytosis according to the specific form of chemotactic influences at work. This being the case, it is obviously necessary that not only the total number of leucocytes should be known, but the relative number of these three predominant types. This can only be determined by the dried specimen in the form of a thin film on

cover-glass or slide properly fixed and stained in such a manner as to differentiate these various forms of leucocytes and determine the proportions of each present in a considerable number of the stained leucocytes—say, for instance, 500. For this purpose Ehrlich's triacid mixture is the best staining fluid, as it makes possible the differentiation of the different forms of granules leading to the recognition, among other things, of the myelocytes when present in the blood. The ordinary eosin hemotoxylin method, which is more easily applied, enables us to recognize the three types of cells already referred to with certain limitations of error perhaps too small to affect conclusions from a clinical point of view. By this method the neutrophile is recognized by the shape of its nucleus and the absence of visible granules, the eosinophile by its large, deeply stained granules and its nucleus, which corresponds closely to that of the neutrophile, and the lymphocyte by its size, shape of nucleus and absence of granules. With Ehrlich's stain, however, the neutrophile granules are distinctly visible; and this stain, supplemented when necessary by a special method for the mast-cells and the Nocht-Romansky method above referred to, is in every way to be preferred.

The essential point, however, is that in connection with every leucocyte count there should be a differential count of a properly fixed and stained specimen with a view of determining the precise type of leucocytosis present. In some cases it will be found that the increase is due almost entirely to lymphocytes, while in another it is the neutrophiles or the eosinophiles; or the increase may affect several types of cells at one and the same time, though it is nearly always the case that one or the other form of cell will be sufficiently increased to enable one to label the leucocyte as belonging to a particular type.

In attempting to make an analytical study of my own experience I collated some seven hundred counts in a large variety of diseases, mostly of a chronic nutritional type, but find the task of their detailed study altogether too large for the scope of this paper, and have therefore selected 131 consecutive cases of chronic gastritis, with a view of studying the general character of these cases and see what light, if any, the leucocyte count would throw upon the general features of a case. In substantially every case

upon which the classification is based the leucocyte count was made during the progress of digestion. Furthermore, the cases are divided into six groups, the first comprising those of a leucocyte count, with 1,000 to 3,000; the second, 3,000 to 5,000; the third, 5,000 to 10,000; the fourth, 10,000 to 15,000; the fifth, 15,000 to 20,000, and the sixth over 20,000. The method sometimes adopted of giving the average count in a particular type of disease is obviously absurd and can lead to no rational conception of the meaning of leucocytosis and its character in that disease. As illustrating the force of this remark, I recall the report of a series of cases of pneumonia in which by the fallacy of averages if the individual counts were not examined, it would have been made to appear that the count in the cases which recovered was the same as in the fatal cases. In the fatal cases the count ranged from a very low count of perhaps three or four thousand in the cases which were overwhelmed by the infection and failed to offer any resistance, to those of a very high count at twenty-five or thirty thousand, and it so happened that when these individual counts were added together and divided by the number of cases the result was almost precisely the same as the average in the milder cases.

It is only by dividing a considerable number of cases of particular diseases into groups based on the leucocyte count, and studying these groups separately, that any practical conclusions of value can be reached, or at least a rational attempt made to throw some light upon the question as to whether the number of leucocytes present in the peripheral blood has an important or substantial bearing upon the main clinical questions with which we are usually concerned.

So far as this particular series of cases is concerned, the following tabular statement gives the result of such an analysis:

LEUCOCYTES IN 131 CONSECUTIVE CASES CHRONIC GASTRITIS.

Leucocytes	1,000 to 3,000	3,000 to 5,000	5,000 to 10,000	10,000 to 15,000	15,000 to 20,000	Over 20,000
Cases	10	17	70	27	5	2
Per Cent	7	13	53	21	4	1½

In considering the leucocyte count in these cases it should be stated that in a large number of them no differential count was made. The only inferences therefore that can be drawn are as to the total number of leucocytes, considering the number to be of normal proportions so far as the different types are concerned. While this lessens their value and is a defect which should be remedied in all further work along these lines, yet it is undoubtedly true that a very large proportion of all cases of leucocytosis is of the type just indicated, or rather that the increase affects the neutrophiles more than any other form of cell. Any conclusions, therefore, that can be based upon such a study would not be greatly invalidated.

In carefully studying the groups of cases of gastritis made with reference to the leucocyte count, I have been unable in the first three groups ranging from one to ten thousand to discover any striking characteristics belonging to each one. Their response to therapeutic measures and the general severity of the morbid process was very much the same in one group as in that of another, excepting that in the first group in which the leucocyte count ranged from one to three thousand there appeared to be a somewhat severer grade of general debility and lack of vitality than in the other two. This, however, was not very marked, and the number of cases was somewhat too small to base a definite conclusion upon them in this respect. Moreover, these features of individual cases were more accentuated in some of the patients with higher leucocyte counts than in those with lower. Ehrlich, himself, I believe, does not attach great importance to the condition known as leucopenia, and further observations will be required to settle this point.

When it comes, however, to the cases with counts ranging from ten to fifteen thousand there is in a large proportion of them strong evidence of the sort of infection which is commonly designated autointoxication of gastrointestinal origin, and I am of the opinion that leucocyte counts of this range have some diagnostic significance in this direction. With reference to the cases with a count of from fifteen to twenty thousand, this is still more marked. The two cases with counts above twenty thousand were

complicated one with tuberculosis with a mixed infection and the other with a chronic infection of unknown nature which proved fatal, no opportunity being given for an adequate study of the case.

There are many other questions concerning leucocytosis which it was my intention to canvass in this paper, but the proportions which it has already assumed makes it necessary to close at this point.

The following conclusions appear to me warranted at the present time: First, a routine enumeration of the white cells in the peripheral blood is of sufficient importance to be made a regular procedure so far as possible in all cases. Second, a single leucocyte count is entirely insufficient as a basis of conclusion in any given case and should be followed up by several made under different conditions. Third, an increase beyond ten or twelve thousand leucocytes in the peripheral blood indicates varying grades of intoxication with chemotactic substances of some sort or another. Fourth, whether it indicates suppuration or not is a question to be determined by carefully weighing all the facts in each case. Fifth, the leucocytoses indicating suppurative and allied processes are of the neutrophile type. Sixth, the eosinophile form of leucocytosis indicates among other things, and perhaps principally, cutaneous diseases or parasitical diseases in the intestine or elsewhere. Seventh, lymphocytosis clinically signifies an irritative lesion of the lymphatic apparatus. Eighth, a differential count should be made in all cases to determine the type of cell which has been the subject of the principal increase where such increase exists and such records carefully kept and collated as a basis for the determination of the clinical significance of leucocytosis in the future.

THE PRESENT STATUS OF THE X-RAY IN THERAPEUTICS.

BY A. M. COLE, A.M., M.D., OF INDIANAPOLIS, IND.

Most therapeutic agents take their place in medicine only after considerable struggle; a certain time must elapse and certain experiments and observations be made before a just estimate of therapeutic values can be determined. During this struggle the tendency of the human mind to extremes shows itself, on the one hand, in exorbitant and radical claims which are never substantiated, on the other hand, in therapeutic nihilism which would decry all discoveries or progress in curative medicine.

Today we are witnessing these extremes in the literature of the X-ray. Many claim it as almost a specific in malignant growths, and some, especially the surgeons, accord it scant praise. Although used therapeutically only a few years, it has shown evidence, in certain disorders, of such remarkable curative power, that it is important today to give it a relative rating as a therapeutic agent and to designate the class of diseases and the particular pathological conditions most susceptible to its action. It is too early to determine its exact value, but from the mass of evidence at hand—even though much of it is doubtful and unscientific—I believe we can reach some general conclusions, state some of the limitations and note some of the possibilities in X-ray therapy.

In studying this particular agent we must contend with some complicating factors and unusual conditions which vitiate many reports and render it difficult to separate truth from error, and these must be understood and considered by one attempting to reach fair conclusions and assign the proper value to the X-ray. These factors are, first, the ignorance of physicians in general of the physics of electrotherapy and the X-ray, and the utter disregard of the proper technic in applying this therapeutic agent,

Hearing favorable reports of this new and mysterious force, or witnessing some of its curative effects, an outfit is purchased and patients treated without any study of the subject or any practical instruction. Much harm has resulted from such ignorance; severe and incurable burns have occurred, and death in several instances. Reports from such sources can not justly be considered in estimating the therapeutic value of the Roentgen ray. Again, much worthless or inefficient apparatus has been sold to physicians. Small, cheap static machines, badly constructed coils, nonregulating tubes, etc., have been bought by the too credulous profession; and when failure has followed the X-ray has been condemned. I know personally of several prominent surgeons and dermatologists who are discrediting the X-ray as a therapeutic measure where the poor results are due to their ignorance of the art, their disregard of the proper technic, or their inefficient apparatus. Drugs of the same name are alike, are given in like doses, and do not differ markedly in their effects; but the X-ray is an intangible force of varying quality and quantity, is applied in different ways according to the effect desired and the disease treated; its use in medicine is an art, and to produce the best results demands study and experience. While the credit of the X-ray in professional minds has suffered through the prevalence of the above conditions, it should be remembered also that we must disregard much that has been written by the too enthusiastic advocates of the new treatment, who have rushed into print with startling claims based on unreliable observation, mistaken diagnosis, or a desire for sensational methods.

In taking up this subject specifically, I shall first consider the X-ray in malignant growths and tubercular skin diseases, and, from my own experience and the reports of well-known authorities, try to formulate some general conclusions.

Rodman, of Philadelphia, last year from an extensive study of the literature, found reports of the X-ray treatment of 234 cases of epitheliomata with 65 per cent. cured, 36 per cent. improved, and 2 per cent. unimproved; 90 cases of rodent ulcer, with 48 per cent. cured, and 52 per cent. improving at the time of the report; of 74 cases of lupus vulgaris, with 88 per cent. cured and

12 per cent. improving. He says, "When we realize that the greater number of these cases was recurrent or inoperable, either because of their extent of their location, and in many instances the cures and improvements were remarkable, we must acknowledge that the X-rays are a valuable adjunct to surgical treatment." In conclusion he sums up as follows:

1. The length of time required for the cure of epitheliomata is longer than by surgical or caustic treatment, while the cosmetic results are better.

2. It is absolutely the best means at our command for the treatment of superficial tuberculosis and it gives better cosmetic results.

3. It should follow all operations for malignant disease or tuberculosis, with the twofold object of stimulating the healing process and of preventing a recurrence. In some cases it may be of advantage to give a course of treatment before operation to destroy the outlying portions of the growth and make such operation of a less formidable nature.

William B. Coley, of New York, publishes in the Medical Record a very exhaustive and scientific study of this subject based upon wide observation in seventy-five cases of malignant growths occurring in his own practice, including twenty-five sarcoma, twenty-one carcinoma of the breast (seventeen inoperable) and eleven cases of abdominal cancer. He says that he can not advise the X-ray in any operable growths, but recommends their surgical removal, followed by X-ray exposures as a prophylactic against recurrence. He agrees, however, with Malcolm Morris, always a strong advocate of surgical methods, that the X-ray should be used in many cases of operable epitheliomata and rodent ulcers of the face, because of the excellent cosmetic results and the destructive action of the rays upon insidious, nonevident foci. He says in conclusion: "We find abundant evidence that the X-rays have an inhibitory action on all forms of malignant tumors, yet the number of cases is insufficient to enable us to state what particular varieties are most susceptible to this influence. So far it would seem that sarcomas, primarily in the lymph glands, yield most readily to the treatment. Superficial epitheliomas might be

placed in the same category. Several cases of recurring carcinoma of the breast have been observed in which the growths have entirely disappeared after prolonged exposures of the X-rays. Yet all these cases have been too recent to be classed as cured. In fact, sufficient time has not elapsed in a single case of cancer treated with the X-ray to justify us in regarding it as cured. While this should, on the one hand, prevent us from reporting patients as cured in whom the tumors have merely disappeared under treatment, it should not, on the other hand, lead us to minimize the importance of these immediate results, even be they no more than a prolongation of life or an alleviation of suffering. One can not witness the marvelous melting away or disappearance of an undoubtedly malignant tumor under a few weeks' or months' treatment with the X-ray without feeling that we have a new and powerful addition to our hitherto scanty means of attacking this disease. The knowledge of this new agent is so slight that there is added hope in our very ignorance. For by a deeper insight into its nature, gained by further experience, we may hope to better utilize its power and thus accomplish greater results.

In the X-ray work at the Massachusetts General Hospital a great number of cancer cases have been treated. The report states that epithelioma give "the most constant and encouraging results." In fifty-five cases twenty-seven were discharged healed; nine progressed favorably but failed to continue treatment, and nineteen were being treated with promising outlook for cure. "Malignant growths below the cutaneous surface," the report states, "should not be treated by the X-ray with the hope of curative effects." As a palliative, however, its use is recommended. Twenty-one cases of tuberculosis of the skin were treated; among these nine cases of lupus were healed, and several cases of scrofuloderma reacted very quickly:

Dr. Clarence Edward Skinner, of New Haven, Conn., in a paper read before the American Electro-Therapeutic Association last September on X-ray therapy in cancer, states the following conclusions, based upon the study of a large number of cases treated by well-known authorities. In cancers involving the true skin only he claims as large a proportion has been cured, if not

larger, than under any other treatment; that a much smaller proportion has had recurrences within a given period of time, as compared with the cures by the knife or caustics, and when recurrences have occurred they respond readily to a second application of the rays; that the cosmetic effects in the X-ray cures are far superior to those observed after a cutting operation or the use of caustics; that the X-ray treatment usually relieves the pain, and altogether should be the choice of treatments in superficial cases. In cancers involving the deeper structures, Dr. Skinner claims that the ray does, in a great majority of cases, when properly applied, exert a beneficial influence, and that we have on record undoubted cures of deeply located malignant growths, but, as a rule, the deeper lesions can not be reached by the caustic action of the rays, and in the light of our present knowledge these cases should be treated surgically with total extirpation to be followed by courses of X-ray treatment to prevent recurrence.

Dr. C. L. Leonard, of Philadelphia, in a recent article in American Medicine, calls attention to the remarkable palliative effects of the X-ray in the treatment of cancer. He says: "The palliation of the distressing symptoms that accompany advanced malignant disease is a duty with which all are more or less familiar. The use of opiates and their effects upon patients are too well known. The Roentgen treatment, applied as a palliative in many hopeless, operatively-impossible cases, has resulted frequently in cures that, if not permanent, have at least restored the patient to health and given months and even years of usefulness. Many others have had the progress of the disease checked, their pain relieved, their strength restored and external lesions removed, so that they are able to be about while still under treatment. Others, though more rapidly reaching the fatal termination of the disease, have had their more distressing symptoms alleviated. With the palliation of symptoms comes an increased bodily vigor, an increase in weight and general vitality, and this general improvement in the tone of the patient shows the marked stimulus that is given to nature, and the aid which this method renders in the fight against malignant disease." Dr. Leonard also calls attention to the great value of the prophylactic postoperative

course of treatment, and the exceeding importance of the proper technic in securing the best results in X-ray work.

Turning next to the field of skin diseases, we have in the X-ray a therapeutic agent of the most remarkable and unique power. Reports from both European and American sources are almost unanimous in assigning to it a curative action in many chronic skin lesions that is not approached by any method of treatment heretofore devised. Only a few dissenting voices fail to assign it the highest place in skin therapeutics; and these dissenters, with better apparatus and with greater study and attention to technic, will come to know its value. Dermatologists everywhere are giving it recognition. One of the most reputable specialists in Chicago, in a lecture before the Chicago University, made the statement that the X-ray was the greatest therapeutic at our command in seventeen skin diseases, five of which had been incurable before its discovery. This may seem to some an exaggerated view, but I believe that experience will prove its truth.

Time will not permit me to go into this field extensively, but I wish to outline in general the dermatological uses of the X-ray, based upon my own experience and many reports from reliable sources.

In lupus vulgaris the X-ray is curative in a great majority of cases. It is as efficient as the Finsen light and much quicker in its action. In lupus erythematosus the reports are encouraging, though some authorities claim better effects from the Finsen light. In tubercular ulcers and scrofuloderma the reports are all favorable. In acne vulgaris and acne rosacea we have in the X-ray virtually a specific. The cases most rebellious to ordinary treatment yield in a truly remarkable manner, and the results are all we could wish. Reports from every source are unanimous in this view. In eczema, especially the chronic varieties, the X-ray deserves special mention. Chronic thickened patches melt down and disappear, itching is relieved, and if the disease recurs it will likely recur in a region not having come under the influence of the rays. When these effects are better known this most common and troublesome disease will cease to defy our best efforts as it has so often heretofore. In psoriasis the results are equally

good, and it is claimed that recurrences appear at longer intervals or not at all. In the parasitic diseases, especially sycosis, the X-ray has given the very best results. It is the best treatment we have for keloid, chronic ulcers and many forms of birthmarks. In hypertrichosis good results have been obtained; also such rare skin troubles as scleroderma, mycosis fungoides, blastomycetic dermatitis, lichen planus, alopecia areata, have been reported cured by the X-rays.

I can not leave this subject of dermatology without expressing my belief that in skin diseases the X-ray will find its greatest field of usefulness. Its effect upon pathological processes, its power to relieve itching and pain, its adjustability of action, from mildly stimulating to caustic and destructive, all give it a healing power not yet fully studied or understood, and make it especially applicable to skin work. It can not longer be ignored by the few ultraconservative dermatologists, for it has won its place and stands today the most useful agent in skin therapeutics.

Many cases of Hodgkin's disease have been reported as yielding to X-ray treatment, and it was not a great surprise when, a year ago, no less an authority than Dr. Senn, of Chicago, published a case of leucæmia as cured by the Roentgen ray. Since then several others have been reported. Dr. T. B. Eastman, of this city, has presented a case before our County Medical Society. I have a case almost ready to discharge as cured. The white cells have come down from 200,000 per cubic millimeter in five months' treatment to 10,000, the red cells and hæmoglobin have returned to normal, and the patient is, to all appearances, well. The permanency of these results may be questioned, but the effect of the X-ray in this heretofore incurable disease has certainly been most remarkable. In this connection I wish to note that many reports mention a pronounced tonic effect of the ray. It seems to stimulate in some way the blood-making organs. I have noticed this in several cases under my personal observation; conditions of anæmia and cachexia giving way to improved color, increased strength, and feeling of general well-being. This effect, when better understood, may be the means of reaching many cases of the graver anæmias which are rebellious to ordinary measures.

As a means of relieving pain the X-ray shows also a decided action. Not only the pain of cancer, but neuralgic and muscular pains often abate under its analgesic effect. On the other hand, in some cases it seems to have no action whatsoever on pain, either in malignant growths or pain from other causes. This erratic action of this new form of energy is one of the many signs indicating that we have much to learn in this new field of therapeutics.

There are many other diseases and pathological changes for which the ray has been used and recommended as curative. I have had no experience with it in any of these conditions, but will mention them as they are reported by good authorities. There are many accounts of the cure of tubercular adenitis and tubercular sinuses. Williams, of Boston, in a recent article, recommends very highly the use of the ray in these conditions. In tuberculosis of the lung the reports are conflicting; I think the general consensus is against its use. In tubercular peritonitis the outlook is more favorable, and several trustworthy reports have been made. Tubercular joints seem at times to react favorably to the treatment, and it may be tried when surgery is refused or counterindicated.

In summing up, I wish to state that I have advanced in this paper the views of well-known and conservative men—views that bear the stamp of truth—and I base my conclusions upon these and my own experience. I have excluded much that has been written upon this subject because it appeared to me as exaggerated and unreliable and not in accord with my own results. I believe that the X-ray contains therapeutic possibilities that we can now but dimly discern; I believe the future will demonstrate that we possess in this new force—these ethereal vibrations—a therapeutic agent of remarkable efficiency in many and varied fields of disease. I believe that our results will be better from year to year as we learn more of the nature of this agent and can measure out its exact dosage, define its range of action, and more adequately adapt and direct its application.

In conclusion, from our present knowledge I would summarize as follows:

1. In skin cancers the X-ray is almost a specific and should

be given preference over the older treatment by the knife or caustics.

2. In cancers involving the deeper structures the X-ray, with our present technic, will cure only a small proportion. In such cases the treatment should be surgical, with total extirpation followed by the X-ray as a prophylactic against recurrence.

3. In all inoperable cancers the X-ray should be used, for in a large per cent. it prolongs life and acts as a most efficient palliative.

4. In tubercular skin diseases, such as lupus, it is curative in the great majority of cases. In tubercular joints, tubercular peritonitis and tubercular glands it should be tried before advising operation.

5. In skin diseases of a chronic nature, and especially in acne, eczema, psoriasis and sycosis, it is the best treatment known in dermatology.

6. In Hodgkin's disease and leucæmia it has given promising results and should be used in every case.

7. In persistent chronic pain and chronic pleuritis, from whatever source, it should be tried after other methods of treatment have failed.

Let us now consider the X-ray as a diagnostic agent. When Roentgen saw the shadow of the bones of his hand on his fluorescent screen, and realized that he had discovered a form of light which penetrated opaque objects, and published his discovery to the world, the medical profession immediately saw the possibilities of this new discovery as a diagnostic agent. With the crude apparatus of that day surgeons all over the world began to utilize the Roentgen rays, and radiograph fractures and dislocations; and the rays came to be regarded as a unique and important diagnostic agent, several years before its therapeutic properties were known. As apparatus and technic have improved from year to year they have widened the field of application until today the X-ray has assumed an importance as a diagnostic instrument second only to the microscope. Many of the profession do not as yet appreciate its value and regard it merely as an aid to the surgeon in locating fractures, dislocations, or foreign bodies;

but its field is infinitely wider than this, and only those who have the best apparatus and have given much time and study to this subject can fully realize the great value and wide possibilities of Roentgen's discovery.

In briefly detailing the scope of X-ray diagnosis in medicine and surgery I would speak first of its great importance in bone surgery. In fractures and dislocations the X-ray radiograph is familiar to all; it has rendered diagnosis in this field absolutely certain and accurate, and makes prognosis and treatment easy and safe. Fractures involving joints and small bones obscured by swelling and difficult to discover need no longer confuse the surgeon; their diagnosis under a Crooke's tube is easy. The question of inner or extra capsular fractures of diagnosis between sprain and fracture, the certainty of complete reduction, the efficiency of splints or plaster casts, the prognosis—all are determined accurately by the X-ray.

In disease of bone we may obtain shadows which we may diagnose as periostitis, osteomylitis, tubercuar or malignant involvement, according to the appearance of the plate.

In the soft parts we may easily locate any foreign body and exactly determine its position; many new growths may be found and their size and extent marked out; pus collections, even in the cranium, chest, or abdomen may be positively diagnosed and localized by very careful and skillful work. This fact is lost sight of by many surgeons in the diagnosis and localization of brain abscesses, empyemas, and abdominal pus collections. Renal and vesical stones may be found in the great majority of cases; gallstones may often be diagnosed, but their organic nature offers little obstruction to the ray, and consequently little or no shadow results, and they fail oftentimes to positively affect the sensitive plate. With improved technic we may hope soon to achieve a larger portion of success in these cases.

In the diagnosis of organic chest diseases the X-ray has a large field of usefulness. Here the fluoroscope is of more service than the photographic plate. By its aid we may diagnose and locate empyemas, pleurisy with effusion, hydro and pneumothorax, pneumonia gangrene of the lung, tuberculosis, thoracic aneurism,

pericarditis with effusion, and enlarged or displaced heart. Williams, of Boston, claims to be able to obtain shadows on the fluorescent screen in incipient pulmonary tuberculosis before any symptoms or physical signs are manifest. In Germany they have perfected the orthodiagraph, an instrument by which they are able to obtain the exact size and position of the heart. Much scientific work is being done along this line. The different appearances on the fluorescent screen of these pathological conditions in the chest I shall not attempt to describe. In my own experience it has been intensely interesting to study some of the chest diseases under the Roentgen light. With a powerful apparatus and a large screen all the organs in the thorax are easily outlined and diseased conditions, after considerable experience, are readily distinguished. However, at present the particular field is the most impracticable in the whole scope of X-ray diagnosis, as it requires large and expensive screens which soon deteriorate, powerful apparatus installed in a dark room in which it is difficult to work successfully during the day, as the eyes do not readily adapt themselves to the conditions. Yet I believe that the medicine and surgery of the future will demand all the aid in diagnosis the ever increasing uses of the X-ray may render, and all our hospitals will avail themselves of X-ray diagnosis even in medical diseases of the chest.

In other and minor conditions the X-ray has been used for purposes of diagnosis, but time will not permit me to consider this subject further.

Briefly as to the technic, the general consensus of opinion is for large and powerful coils of 12 to 20-inch spark length, mercury turbin or Wehnult interrupters, heavy target tubes which will take a very heavy current for a short time, with short exposures. With the best workers low vacuum tubes are greatly preferred, as they give a larger output of rays and greater detail in flesh and bone; the penetration is controlled by multiple spark gaps. Proper working tubes and proper length of exposure are difficult and important ends to attain. The plates should be developed by the radiographer himself, as no photographer can be trusted to do it satisfactorily. This is an art which requires considerable

experience to attain success, for proper development is no less important than proper technic in exposure.

The interpretation of the skiagraphic plate (improperly called the negative) is of paramount importance. The fundamental fact must be ever kept in mind that the picture is only a shadow of the part imprinted upon the sensitive plate; and to read correctly these shadows, to know the abnormal from the normal, the diseased from the healthy, is the proper knowledge of the radiographer. As the picture is only a shadow, the laws of optics must be observed; many skiagrams are false representations of actual conditions because of a failure to observe these laws. So the distance of the tube from the plate, the position of the tube in relation to the object radiographed, the position of the part radiographed in relation to the plate, and its distance from the plate, all affect the results obtained and determine the truth or falsity of the picture. Slight and involuntary movements during exposure often cause confusing shadows. This may be largely overcome by sandbags and canvas straps. Not only improper technic in exposure, but also unskillful development of the plate, may become a factor of error and must be taken into account in the reading of the picture.

I would say, in closing, that the X-ray has now a permanent and valuable place in diagnosis; and as we learn more of its nature and application it will render even greater service than at present. Some may doubt the value of the X-ray as a therapeutic agent, but no one will deny it an important place in diagnosis. While the apparatus is expensive and its proper application difficult, yet its field is distinctive and marks a great advance in medical science. While it does not supersede any of the older methods of diagnosis, yet in many cases its aid is invaluable. It is another instrument of precision, like the microscope, added to our armamentarium; another means of reaching some diseases, accidents and malformations, whose diagnosis, heretofore, has been either difficult, uncertain or impossible.

DISCUSSION.

Dr. F. B. Wynn, of Indianapolis: I regret that the other paper is not here. I was counting on hearing that before entering into a discussion of the subject. This subject of X-ray therapy and X-ray diagnosis is one of intense interest. I regret deeply that Dr. Cole could not, instead of reading us this paper, show us some of the practical work he has done in diagnosis. I feel the society would have enjoyed that fully as much, if not more, than the paper itself. I am not given, I think, in therapeutics to undue enthusiasm about any line of treatment, but I am a little prone to be enthusiastic about this. I believe there is just ground for it. I want to take up two or three topics.

In the first place, the treatment of cancer. Last year I reported eight cases, which were given a thorough trial. I told you that two of these cases had healed and seemingly were cured, but it would take a long time to demonstrate whether they were permanent or not. Since that time another, seemingly, has healed. But I want to be frank and say that case did not heal with the X-ray alone. I made a curetement and followed it with the X-ray and the case healed. I am very frank to say to you that I am not over-enthusiastic about the treatment of cancer. I still regard it as an adjuvant. In superficial skin cancer it is valuable to supplement the knife and the curet.

There is another difficulty about many of the reports of the cure of cancer. I was anxious to hear the second paper in which a series of cases was reported. I do not think we should report cases until we are certain they are cases of cancer. A microscopical diagnosis should be made. Let me give a case in point. I hope Dr. Craig, of Greenwood, is here. He will bear me out. Something like a year ago a man of an age when one might expect cancer to develop had a nodule develop in the cheek. The doctor removed it surgically, and in about six weeks or two months there was a recurrence of these lumps and they were removed a second time, and after this second removal the lumps recurred again. He presented the patient to me in consultation and I expressed the confident opinion that it was an epithelioma of the cheek,

I said while it was almost certain—hardly any doubt about it—we would curet it and make a microscopical examination, and I was indeed very much surprised to find that it was not cancer at all, but tuberculosis of the skin. I followed the curetement with the X-ray and recovery resulted. Suppose I had not made a microscopical examination. That would have been reported as a cure of cancer with the X-ray, which it was not. There are some other cases which are not entitled to be called cancers. There are pre-cancerous conditions, notably chronic inflammatory processes, associated with diseases of the sebaceous glands, chronic seborrhœa, senile warts, etc., where we have associated chronic inflammatory conditions. They predispose to cancerous development, and the X-ray will benefit them. They are not entitled to be called cancers. I have treated cases since that time. I have a case at present, the widow of a doctor, a member of this society, operated on two years ago for cancer of the breast. It has recently recurred at several points, and under the X-ray exposure they have melted away rapidly. Now, that is true in three cases, but I am not going to say they are going to stay cured.

The field of X-ray therapy is to be limited largely to dermatology, and the field in which it is especially applicable is acne vulgaris. I reported three or five cases last year and since that time I have treated successfully many more cases, and there has not, with a single exception, been a case that did not get well. There is also another condition to which the doctor referred—acne rosacea. Out of five cases four have recovered. In the fifth I can not see much improvement. I might speak of isolated conditions. I have had two cases of chronic, circumscribed eczema, and in that I want to give a word of caution because of my experience in one of those cases. You may treat the case for a week or ten days or two weeks with no reaction and then you will suddenly have a violent dermatitis. That has been my experience.

While I think the chief field of the X-ray treatment is in acne vulgaris, it may be of use in other chronic superficial troubles of the skin.

Dr. L. G. Cromer, of Union City: I find a great deal of difficulty in using the X-ray, and have almost abandoned it. I have

not treated a case for some time. It is very difficult to get the accurate dosage, and that is what I am looking for. I am proud of the advancement in these lines and we ought to take it up and study it in a careful manner. It is all right in the diagnosis of surgical cases or deformities.

Dr. C. S. Bond, of Richmond: As all of you know, I am not given to picking up fads in medicine, but directly after the X-ray was discovered I had a curiosity to try it, and established a laboratory with all the apparatus for X-ray work and tried to determine, if possible, the surgical benefit of the X-ray. I think it has its limitations, even in diagnosis. I want to say emphatically that the diagnosis of the chest organs can not be made out as clearly as has been indicated by the author of the paper. I tried over and over, by all kinds of apparatus, to get definition of the lungs. There is too little differentiation in the tissues. Occasionally we can make out an aneurism of the ascending aorta. I have been able to do that in one or two cases, but as to tubercle in the lung, it is impossible to make a differential diagnosis as early as by other means.

The trouble about the whole matter is, we know so little about it from a mechanical and electrical standpoint. So little is known about it, and its penetration of the body is so severe, that we produce effects more than we intend. In removing epithelioma very often they return again. Those that have not returned get well, some of them by the X-ray. It seems to me there is something in the exposure due to the X-ray, but I think we are doing just as we have in the treatment of consumption—we are going to the farthest extreme before we come back to the mean. We give all kinds of absurd things in tuberculosis. We have made ourselves ridiculous before the laity and we are doing the same thing with the X-ray. It is not good for everything, and the sooner we learn that it is good for a few circumscribed things and learn to use it well in these troubles the sooner we will be on the right track. Men are taking advantage of these numerous speeches in this town and everywhere else to impose on the public still more. Because we are doing some good they will claim they can do everything. I think we ought to "sit down" on this thing.

Dr. W. R. Davidson, of Evansville, related several cases of radiographic diagnosis, X-ray dermatitis and X-ray treatment of melanosarcoma.

Dr. W. D. Swartz, of Portland, did not think it possible to overrate the value of the fluoroscope in the diagnosis of certain things, and related cases to illustrate its value in the location of needles in the extremities and a pin in the esophagus, which was removed by the aid of the gyromele, the procedure being observed through the fluoroscope. He desired an expression from some of the experts as to how long to make the exposure in a given case, or some rule to guide him in making exposures.

Dr. A. M. Cole, of Indianapolis: The technique of X-ray work is too large a subject to go into fully. There are plenty of books published in which you can find this in black and white. Start in gradually. Make your exposure five minutes every second day until you find out how the patient is going to react. They will react differently according to the tube. Do not fear a dermatitis as long as you have a low vacuum tube. The great trouble is, doctors buy nonregulating tubes, and after they are once used the vacuum goes up and you will have a high tube with a penetrating ray. If you get a dermatitis from that tube you will have a bad one. If you buy a regulating tube and keep the vacuum low you will only have a superficial dermatitis. I do not fear it as long as I keep a low vacuum tube.

As to the fluoroscope, there is a very erroneous idea concerning it. Below the diaphragm you can not see a thing with the fluoroscope. You can locate a foreign body in the hand or foot, you can make out a fracture, but as a rule it is not of great value. I use almost entirely the plate. In chest work it is very valuable, though you must have a dark room and remain in it a half hour before you can see very well, and during the day that is not a very practical thing. But ordinarily the fluoroscope is of small value. Do not try to locate your fractures with the fluoroscope. There is not one fracture in ten that you can locate properly with it. Use the photographic plate and your results will be very much more accurate.

I want to emphasize the low tube. The great therapeutic value of the X-ray is in superficial diseases, and in these cases you should use the low tube. I do not use the high tube in one case out of twelve. I would caution you against X-ray burns unless you use the low tube. The burns will give you trouble. I have one case on hand at the present time—the case of leukemia I spoke of. I treated the patient over the spleen, using a medium tube with penetration enough to go through the spleen. Before I knew it I set up a dermatitis, and I have at the present time an ulcer that has been there for two or three months, that will not heal, and I think I will have to remove it with the knife. It is painful and gives the patient trouble. There are many cases of that kind reported, and even deaths from X-ray burns. Almost all of these burns have been caused by high vacuum tubes. I exposed this patient every other day for ten minutes until I set up a slight dermatitis. Then I let him rest for two or three weeks. I think the third time he did not tell me there was a dermatitis, and I was perhaps a little careless and had quite a burn.

I think Dr. Bond has said a good word about the X-ray. Perhaps some of us are too enthusiastic. I think we are now having the reaction. The pendulum has swung the other way. We thought it was a certain cure for cancer. The people found it was not. Possibly it is all right as a palliative means; but I think we are going to use it for other things. A year ago it was not known that it had any effect in leukemia, and today we know it does have certainly a very remarkable effect, and we are going to find still further new uses for it.

DRUG ADDICTION: ETIOLOGY AND PATHOLOGY, AND ITS TREATMENT.

BY ALBERT E. STERNE, A.M., M.D., OF INDIANAPOLIS.

In considering the factors which lead to the use or abuse of various drugs it is essential that we classify, first of all, those addicted to such habits. In the main, we can differentiate two large classes of individuals who become habitues: (a) Those in whom a distinct hereditary influence or taint is manifest, and (b) those who acquire or cultivate drug usage for causes other than the preceding.

(a) Hereditary Influence.—I am perfectly well aware that good authorities deny the influence of heredity among drug habitues, but I do not believe that this ground can well be maintained. First of all, it is a matter of record in the study of the histories of a large percentage of habitues of all kinds that we find taints of various degree in the ascendents of these individuals. It is a matter of very common occurrence to learn that either one or both parents or some immediate ancestor had been the victims of chronic nervous or mental affections, or had been addicted to the habitual use of alcohol, morphine or some other narcotic. When we consider the especial meaning of heredity, it should become apparent that the influence upon the individuality and innate characteristics of the nerve cells of the offspring should be distinct. In all probability, in the light of modern scientific research, we must admit that there is no such thing as hereditary disease, but it is equally certain that the conditions, characteristics and environments of the parent cell may be conveyed to the fetal cell to a disproportionate degree. True, heredity must reach back to the very initial fertilization of the male and female cell. It must exist in the primary conception of fertilization. The particular development of this individual fertilizing cell undoubtedly modifies either

in the one or the other direction, the manifestations which may be, at the beginning, inherent in this cell. After fetal life, conditions of environment and education and the development of associations further serve to modify, for good or for evil, the inherent characteristics of the primal cell. Upon this basis of reasoning, it seems to me, it would be impossible to conceive of malignant disease as existant in the primal fertilization, else would the ovum never develop into maturity. This would not necessarily obtain where we were dealing merely with tendencies of the parent cell, which might later develop, through circumstance or environment, into a nervous diathesis, resulting finally into a state of atavism. It is a well-known fact that the progeny of chronic invalids, of epileptics or alcoholists and mental and moral wrecks develop the tendencies of ancestry to an augmented degree. The annals of criminology, as well as of the great charitable institutions of the world, reveal this to a remarkable degree. It is my belief that the same thing can be demonstrated in the peculiarities of the offspring of those addicted to the inordinate use of the various drugs. It has been claimed that the pathology of chronic morphinism differs materially from that of chronic alcoholism. Upon this ground it has been claimed that the effect upon the offspring of morphinists is in no wise similar to that of the effect upon the offspring of chronic alcoholists. To this doctrine I am absolutely opposed. If it be granted, as it undoubtedly will be, that addiction to any drug through a long period of time brings with it a deterioration of cellular activity in the higher brain of the user, then we must also admit that the character of the fetal cell would be determined in analagous wise to that exhibited by the cellular deterioration in other affections. This is especially manifest when we consider the development of the ovum in utero of a mother whose system is impregnated by the physiologic effect of opium. Examples of this malignant and characteristic effect have repeatedly been found in new-born infants—of mothers who, during the period of gestation, had been using morphine, either alone or in combination with other drugs, constantly. Such infants, immediately after birth, differ from ordinarily healthy children in

that they are apt to be inordinately drowsy, refuse to nurse, and have been known to sleep steadily for twenty-four hours. After the period of somnolence, the stupor disappears and these infants show excessive irritability, have colic pains, and are liable to be come very cyanotic. These are the so-called "blue" children. The cyanosis is unquestionably due to a lack of closure of the ductus arteriosus and foramen ovale in the heart. The administration of opium in those instances where the development of the child has not been irreparably arrested promptly relieves not only the irritability and the colic-like pains, also the cyanosis, and, moreover, the opium must be administered constantly and the child must be weaned away from it in the same way as in adult narcoticism. It must be understood that the foramen ovale is never closed until after the birth of the child; that it is the very last remnant of fetal existence which remains to be completed. If so malignant an organic defect can result from habitual use of morphine, then I can not conceive of any valid ground, which could dispute the effect upon nerve cells in the higher brain, notably in the presence of the evidence which is manifest in the relief of the symptoms through the administration of opium in any of its forms. We will all of us grant without question, I believe, the effects upon the mental and moral sphere of the progeny of drug habitues; yet the mental and moral determination of the cells must be dependent upon the healthy organic conditions of these cells, upon their ability to exhibit the normal characteristics of brain cells, especially as regards their motility—that is, their power to alternately become active and to fall into repose.

The limits of this paper forbid an extended inquiry into this feature of the subject, although the development of cellular psychology is to me most fascinating. In the histories of those drug habitues who take up the so-to-speak inherent tendency to the use of the drug, it is remarkable to find the constantly recurring fact that either one or both parents or immediate relatives were also drug users.

Before leaving the discussion of the heredity of drug addiction I wish to make a distinction betwen morphinists and morphino-

maniacs. A morphinist is a person who uses morphine either occasionally or for periods of time, but in whom the craving for the drug has not developed to the point of total inhibition or control. A morphinomaniac, on the other hand, is an individual who, through the use of morphine, has developed a systematic craving for the drug which he can no longer resist. We have an analogy among the users of alcohol where we may distinguish between the alcoholism of the periodical user and the alcoholism of the dipsomaniac.

(b) Acquired Drug Addiction.—The occasional causes for the acquirement of drug habits are too numerous to classify, but, taken as a whole, they may be subdivided into—first, the use of drugs purely as a stimulant; and second, their use to efface some physical or mental distress, whether these be in the nature of pain, worry, grief or shock. Ultimately, the main factor in the causation of all drug habits, whether they be based upon hereditary influences, upon physical or mental weakness or upon physical or mental pain, is always the same, namely, the weakness of the nerve cell and the lack of the vital force, which make the individual powerless to combat the strenuousness of existence. In the one or the other direction, the victim seeks to fortify his failing physical or mental power through the aid of a stimulant. Unless the individual be burdened by extremely strong hereditary taints, or be subject of innate vicious moral principles and of the lowest and lower grades of intellectuality, there is usually some element of physical weakness in play which he endeavors to overcome through artificial means. A study of the individual histories of such persons will almost invariably show that there has been some definite cause which has brought about a physical incapacity to deal with the problems confronting him. It is not at all unusual to find that a previous illness has resulted in bodily prostration, not infrequently associated with a greater or less degree of insomnia, to overcome which the patient has had recourse to alcohol in some form to sustain the physical vigor and opium in some form to bring on sleep. It is almost as frequently true that mental or physical pain has been the source of the drug addiction.

In this connection it is but just to say that members of our own profession have often been derelict in their attitude toward their patients, in that they themselves have thoughtlessly prescribed stimulants of the alcohol variety and used narcotics of the morphine variety in a careless manner and in individuals whose resisting power was so low that they readily became the victims of a habit which had been found to bring such material relief. I take this occasion to condemn the practice, wherever it may exist, of using opium to induce sleep. Opium and its derivatives should be used only for the definite purpose of relieving intense pain and then only as a last resort and under circumstances which warrant the physician in the belief that his patient will not become addicted to its use. I am perfectly well aware of the fact that the demands of a large country practice occasionally seem to make it necessary to use this dangerous drug liberally, but it is just here that physicians often make the very grave error of being too much influenced by the sufferings of the patient or their own convenience. It is a singular fact that a great number of drug habitues are imbued with the belief, in the earlier stages of the addiction, that they can stop at any time; that their will power is sufficiently great to overcome the habit. They can do so oftentimes for a little while, but when some momentary cause obtains they usually rush back to the unsafe refuge of the drug, which happens to have become their source of reliance. It is in just such persons as these that the habituation becomes more and more manifest, and the native instability of character and purpose which these persons show in their ordinary life should be a warning to the doctor to be extremely careful of his treatment of the case. We can not condemn too heartily the practice which is largely in vogue throughout this and other countries, notably in thinly-populated districts, of placing considerable quantities of these drugs at the disposal of patients, and not infrequntly placing in their hands the hypodermic needle for their convenient usage.

While alcoholism is a social evil which boastfully parades itself to the onlooker, morphinism and the similar vices hide themselves

carefully away. Indeed, the cunning of the drug habitue, in this respect, has become almost a proverb. I have stigmatized alcoholism and drug narcotism as social evils, and this I truly believe them to be. The former in a mild degree has become almost universal throughout all ranks of society and over all countries of the universe. It seems to me that it is incomparably more common today than it has ever been before. It is not at all unusual to find young girls and boys occasional tipplers, either with or without the consent of the parents. That this is so needs no argument beyond that daily shown in any of the places of public hospitality. While a few years ago it would have been a rare thing to find a group of young people indulging in the use of wine or stronger drink, it is an extremely common thing today to find the young ladies of a party ordering cocktails and highballs, to say nothing of champagne and wine, and even to those of us who are occasional users of alcohol in some form such exhibitions—as that not infrequently seen among the younger set—are hardly elevating or encouraging.

To the ever-increasing army of alcoholists and drug users, men and women of the higher social strata are bringing a vast contingent—certainly as large, if not even greater, than the total number of recruits from the lower classes. The reason for this is not hard to find, when we consider for a moment the vast amount of intellectual and vital force necessary to keep up with the advance and demands of civilization. While it is equally true of lawyers, clergymen and social idlers, perhaps the best example, and the one which appeals most to us, is that of the physician who himself becomes a drug habitue. Unfortunately, a greater and greater number among our profession are seeking assistance and solace in this direction. We are especially unfortunate in that our knowledge of medicine and the various drugs, and the readiness with which we find them constantly at hand, makes the physician the easiest victim of all. The doctor with a large amount of work and worry, with the ceaseless mental strain, often associated with physical hardships and loss of sleep through the demands of his professional duty, who misses this week one night of sleep and

the next week two or three, feels that he needs something to stimulate and keep him in professional harness. He says to himself that he knows all about the drug he is using, that he knows its influence, that he knows its effects and its side effects, that he can stop when the latter show themselves; but it is for all the world like getting on a toboggan slide and determining to step off when you are half-way or three-fourths down the course. It is a very easy thing to determine to do, but an extremely hard one to accomplish. It has always seemed strange to me that physicians who need such stimulants do not seek the safe refuge of strychnia, instead of the dangerous solace of opium and alcohol.

Pathology.—In the study of the pathology of these conditions we are confronted with very difficult problems. In many instances we are dealing with the finest, most minute details of the anatomical and physiological structures of the body. The effects of alcoholism in this respect are well-studied and clearly understood. We know that alcohol, used in constant or varying quantities, exercises an extremely deleterious influence upon the vascular system throughout its entirety. Secondarily, we know that it extends its pathological effect to the various cellular tissues of the body, notably that of the nervous system. I am referring here especially to the individual who is denominated a "steady drinker" —the man who always drinks and who prides himself upon the fact that he never becomes intoxicated. It is just this man in whom the effects of the stimulant are most manifest. Your occasional or periodic drinker—unless these occasions become so frequent as practically to form a continuity—comes to little or no grief, but your steady drinker is the one in whom the delicate regulatory mechanism of the vascular system becomes early impaired. From this point onward the pathologic process is constant and destructive, and ends in the hardening of the blood-vessels, which predisposes to tissue inanition and faulty tissue metabolism. In consequence, we note the general disturbance of the emunctories, with disease of the kidneys, liver and the other organs of the body. In the nervous system the effect is especially bad. Here we note not only vascular changes with degeneration

of the blood-vessel walls, but we have characteristic cellular changes in the brain; disarrangement of the chromophyl granules with distortion and dislocation of the nuclei and nucleoli, and vacuolization of the cells. If the process does not go too far, we find in such cases manifestations of the disturbance of the function of the nerve cell, with a loss of power for activity and repose, which is indicated by a general neurasthenia and cerebrathenia. If, however, the process passes beyond this point, which I should designate that of recoverability, then we have exhibited the paralysis of power of the cells in whatever field of function they may represent.

What has been said of the pathological effect of alcohol is, I believe, equally true, though probably in far less degree, of other drugs used to excess. While many good authorities contend that this is not the case and that morphinism and its sister vices are purely diseases of the moral and mental sphere, it seems to me that they forget the essential power of motility in the brain cells. It seems to me that it makes no difference whether we are dealing with a brain cell of motor function or moral function or intellectual function, the same principles must hold good in any or all of these cases. Personally, I am an adherent of the doctrine of the motility of the nerve cell, which in its normal condition has the power to change somewhat its form by withdrawing its dendritic processes from contact with other processes, but in nowise has the power of changing its concrete location. If, therefore, for any cause this loss of motility in the nerve cell, which is a structural thing, becomes impaired beyond the power of recovery, then we have a pathologic basis of a structural nature in the cell itself. I believe, therefore, that not only chronic alcoholism, but also chronic drug addictions of every kind, have a physical basis. We must not lose sight of the fact that structural changes of the cell, heretofore beyond our limits of vision, are now known to be possible of study by means of intense lateral illumination, which has increased the power of our microscopes many hundred-fold. In the near future we may justly hope to acquire definite knowledge of pathologic cellular and other changes of which, at the present time, we have no adequate conception.

Just as the fundamental factor for the necessity of all stimulation by drugs lies in the innate loss of force within the nerve cells, so the universal ultimate pathologic effect of almost all drugs used to excess is to render the entire organism highly acid. Certainly is this true of alcohol and opium, the most common addictions. Whether or not many of the pathologic tissue changes do not depend directly upon the hyperacidity of the system remains as yet a matter of doubt and study.

Treatment.—In the treatment of drug addictions we invariably have a two-fold duty to perform. It is not only necessary to withdraw the drug, but it is essential also, in order to effect a cure, to eradicate, if possible, the basis upon which the addiction is founded. In a measure, therefore, each patient presents an individual problem aside from his weaning away from the use of the poison and the direct effects which may have been engendered in his system by the long-continued empoisonment. To enter into the detail each problem of this character presents would naturally lead us into an endless discussion, and for the purpose of this paper it is unessential. I merely wish to emphasize the absolute necessity, which is only too frequently overlooked, of restoring drug users to complete health and strength after the successful withdrawal of the drug itself. It makes no difference upon what basis, or from what source, or from what cause the addiction had been acquired, it is positively necessary in every case to restore the individual to complete health and strength; otherwise, we may confidently expect a relapse into the use of the drug as soon as the patient regains full liberty. This point I feel that I can not emphasize too strongly, as it is almost constantly neglected and on this account so many failures in these cases are matters of record.

At this time I shall limit myself entirely to the question of the sanatorium treatment of alcoholism and narcotism, but in passing I may say that I do not believe that anyone can be successfully treated, save in rare instances, outside of institutions where complete control of the patient can be exercised. Personally, I never attempt the so-called "home" treatment, or any of the so-called specifics against these diseases, which from time to time are

falsely presented for our endorsement. There are no specifics, and most of those which claim to be so contain drugs which, if used long enough, exert as baneful an influence upon the individual as that of the original addiction. It is merely a question of substituting one drug for another, and unfortunately it is a matter of daily experience to find that persons addicted to the use of one drug often, of their own free will, pass to the use of another, so that they need no help from the medical profession in this direction.

The withdrawal of the drug used may be accomplished in two ways, either absolutely and suddenly, or very gradually by the weaning process. The sudden withdrawal can be successfully accomplished only in persons who show considerable physical strength and when it is attempted we must bear in mind the necessity of supportive treatment—in my experience best accomplished by strychnia in large doses during the treatment. In addition we must not lose sight of the so-called abstinence symptoms which almost invariably arise, unless they be counteracted. These symptoms have been designated and believed to be due to the loss of the physiologic action of the drug to which the system has been accustomed. This view I believe to be erroneous. They depend rather upon the extreme acidity of the entire organism brought about by the use of the drug, but to a great extent masked during the period of its employment. They can usually be overcome by measures adapted to the counteraction of the acid state. We usually find more severe abstinence symptoms among morphinists than among alcoholists, for the reason that often after complete withdrawal of the drug we find in the stomach secretions of morphinic and dimorphinic acids, whose absorption seems to increase the signs of abstinence. In those cases in which the abrupt treatment is indicated we are enabled to overcome the symptoms of withdrawal by stomach washings, if necessary several times daily, and the use of liberal quantities of alkaline waters, such as Vichy, to which has been added a sufficient amount of bicarbonate of soda.

The nervous symptoms are best overcome by exhibition of bromides, which also assist in the alkalization. Strychnine nitrate

should be used hypodermically as often as necessary, and there is no limit to its employment save as shown in the individual case. In the gradual or weaning treatment it is usually not necessary to resort to the use of the stomach tube, but I invariably advocate the liberal use of alkaline waters even in these cases. It is not necessary to enter into the method of reduction in the amount of narcotic, as this can be accomplished in various ways, but always upon the same principle. However, I wish to say that if the weaning treatment be employed it should be carried out with the minutest mathematical detail and continued up into the hundredths of a grain daily before the entire withdrawal be considered accomplished. In these cases also it is my custom to advise the use of bromides and strychnia, preferably hypodermically, especially if the habitue had been accustomed to the use of the needle during his addiction. While the hypodermic needle is a very convenient weapon in the hands of the habitue himself, it remains an equally convenient instrument in the hands of the physician for purposes of treatment, inasmuch as an increase in the amount of strychnia can be accomplished in a proportionate ratio as the amount of morphia is decreased. At the same time that these measures are employed, whether in the rapid or in the slow treatment, our efforts are greatly increased and our success can be immeasurably augmented by the proper use of mechanical measures, such as baths, massage, electricity and phototherapy. It is very essential also to control the exercise of the patient. We must recollect that such individuals are usually extremely impoverished physically, that they almost invariably present a greater or less degree of nervous and muscular exhaustion, and that the physical condition, quite aside from the drug habit, would make them candidates for a very strictly carried out or a modified "rest cure." A tonic medication is also usually indicated.

In the main, I am inclined to look upon the general condition presented by the drug habitue as one of inanition, due to a lack of oxidation, and should be treated very much as other conditions of the same character which have arisen without habituation.

The success of our treatment and the prognosis of the case de-

pend entirely upon the degree of damage which the patient has brought upon himself. In those instances, where comparatively little impairment has been wrought, as in the early cases, success is the rule and the prognosis is good, provided, always, that the treatment be carried far enough and the basis upon which the addiction has been developed is not left behind to again exert its deleterious influence. The same may be said with equal truth in such cases as may be designated as of the medium grade, whereas it is quite the contrary in those instances in which degenerative changes have made themselves manifest. Here we may confidently look forward to failure in our treatment and an extremely grave prognosis for the individual.

Ere I leave this subject I wish to add one word of warning: Never trust a drug user. Save in rare instances they have become, if they were not naturally so, cunning liars and cheats, whose moral sensibilities have become so blunted as to render them absolutely untrustworthy. They need constant watching and restraint, and it is on this account, especially, that they can not well be successfully treated at their homes or while pursuing their daily avocations.

TREATMENT OF DRUG ADDICTIONS IN PUBLIC INSTITUTIONS.

BY MARTHA J. SMITH, M.D., OF INDIANAPOLIS.

The taking of intoxicants is extremely ancient. The history of the use of cocaine and cannabis indica has a similar antiquity, and the pleasures of the poppy have been sung by poets and preserved in literature for ages. The habitual use of intoxicants and drugs at the present time is extensive and the occasional indulgence enormous.

The October, 1903, number of the Journal of Pharmacy contains an interesting article by Eberle and Gordon, of the committee appointed by the American Pharmaceutical Association to report on the acquirement of drug habits. The report shows that the opium habit is rapidly increasing, the majority of the class known as habitual criminals being opium habitues. The committee states that the drug habit has alarmingly increased in the army and navy, and that opium smoking has been acquired by some of our soldiers in the far east. The report which refers to the use of cocaine and the cocaine habit shows a worse state of affairs. The drug is sold undisguisedly in many drug stores, and druggists buy it in 100-ounce lots, sometimes as often as once a month. The effects of the cocaine habit are not so generally known as those of morphine, but there is nothing yet discovered that has such a baneful effect on the user. Any drug which affects the nervous system seems to obtain its habitues. The heroin habit has made its appearance, headache remedy habits are reported, diarrhea remedies are reported habitually used by a large number who soon or late become morphine or laudanum users.

The treatment of drug addictions in public institutions is usually a most difficult matter, but has its advantages, because you

have complete control of the patient and the care of the case in a hospital with the services of a nurse to assist you in your treatment. It is well to bear in mind the character of the individual with which we must deal, as the patient is usually highly neurotic. The intellectuality of the subject does not exclude the possibility of such a nature. The pathological changes that may have taken place in the body from the use of the drugs or other causes should receive attention, but we should not confuse symptoms of drug addictions with real organic changes. Ascertain if possible the real cause for first taking the drug and in what form and manner it has been taken, whether for the relief of pain, or pleasure; and if the patient has been accustomed to use patent nostrums. The removal of the cause, when possible, should be the first step in treating any case of drug addiction. If the patient, for instance, has been suffering from a severe neuralgia and has contracted the habit in this way, attention should be given at once to the relief of this condition. Alcoholics and narcotic habitues present to a marked degree two different classes for treatment; the alcoholic needs close watching and vigorous treatment for a few days, and if properly managed the worst is over; while the narcotic habitue is beset with difficulties and requires constant watching and must be handled with care but with an iron hand. Months of abstinence and good health are required before a complete cure and mental balance can be restored. No case of drug addiction can be successfully treated to the best advantage except in a hospital or sanitorium where the patient can be constantly under the care of a competent physician and a nurse having special knowledge of the disease under treatment. It is impossible to treat such a case properly while the patient has the slightest freedom or at the patient's home, because the patient can not be trusted to carry out your orders and he is usually irresponsible and untruthful and friends will yield to his appeals for the drug. To stop the drug is the first but not the most difficult step in the treatment of these cases. The morbid effects produced from the continual use of such drugs must be gotten rid of and the system restored as soon as possible to normal condition. The drug must

be given up absolutely, and if necessary substitutes be given to lessen the irritation and depression which follow. Our books warn us against sudden withdrawal of the drugs because of the danger of heart failure and the suffering produced, but my experience does not bear this out. However, in private practice and in the aged or those debilitated from disease the gradual withdrawal of the drug seems the only procedure.

In alcoholic addiction the total renunciation of all stimulants is the most essential measure, and this can only be accomplished in a hospital where the case can be watched and away from evil associates. The system must be freed from the toxic and excrementitious matter. Strychnine given hypodermically in large doses is an efficient tonic. Bromides, chloral or hyocin, may be used to promote sleep. Aromatic spirits of ammonia may be given if the pulse becomes weak. Careful feeding is one of the most important elements in the treatment. If delirium follows, the patient should be watched carefully day and night; but as the delirium is only a symptom of disease it usually runs its course slightly influenced by medicine. The indications are to procure rest and support the strength of the patient.

The morphinist usually begins with one-fourth grain of morphine and rapidly increases to fifteen grains or more daily, and finally, becoming alarmed, resorts to the use of alcohol as a stimulant and gradually may add cocaine in the effort to be relieved; but the patient is seldom willing to give up his favorite morphine entirely. I believe in the vast majority of cases it is best to immediately withdraw the drug. I saw more actual suffering from the gradual withdrawal method in one case than in eighteen others treated by the immediate withdrawal of the drug. Most of the cases had used alcohol in addition to morphine.

Dr. Margaret Hallack, of the New York State Reformatory for Women, reports a series of five cases of morphinism treated successfully by the immediate withdrawal method without any great suffering. Strychnine, hyoscin and codein were used in the treatment of the cases.

The observations of Dr. John Robertson, of California, on fifty

cases admitted as insane from the opium dens of Chinatown were to the effect that the sudden withdrawal of the drug was not dangerous although it appeared heartless.

After careful examination to ascertain the real condition of the patient, my method of treatment, as carried out in the State Industrial School for Girls and Woman's Prison, is to assure them that they will recover if they will only follow instructions, but morphine, cocaine or alcohol is not kept or used in the hospital. They express a desire to be cured and I secure their word that they will submit to my treatment. In addition I make it a point to use much good cheer along with all I do for them. Have the patient carefully watched, but do not allow him to know this fact. Empty the alimentary canal of the accumulated excrementitious matter with a large dose of castor oil. If this is not efficient give a high enema. This should be followed with an anticonstipation pill containing strychnine, aloin, belladonna and cascara at night until the bowels are moving normally each day. A cool, salt-water sponge bath should be given each morning; light but nutritious diet at least four times daily; little medicine need be used. One drachm of the tincture of valerian with 20 grains of bromide of sodium may be given at night to promote rest. But this is given more to afford the patient a feeling that something is being done for him than the actual good obtained from the medicine. Strychnine or aromatic spirits of ammonia may be used if the pulse shows signs of weakness. The patient recovers rapidly. At the end of one month you would scarcely recognize the case as the same.

In the treatment of cocaine addiction I follow a similar plan of treatment to morphinism by immediately withdrawing the drug and using the expectant plan of treatment. Six cases were successfully treated in this way. The cases were under observation from one to three years.

I have had no experience with the iodides of mercury in the treatment of cocaine cases, but I find they are now being used.

In conclusion I would say that drug addiction cases can not be considered cured in less time than one year, and the patient may

then relapse if allowed to mingle with old associates; and that it is necessary to be able to have complete control of the case for success. I believe a large percentage of cures can be made and the patient restored to health physically, mentally and morally if properly managed.

DISCUSSION.

Dr. W. B. Fletcher, of Indianapolis: Mr. President, about twenty-five years ago I had a patient that had not spoken for seven years, and I found that a portion of his skull was crushed in upon the left side, and we operated on him out at the old Hospital for the Insane. The next day I went to see him. I heard he had been swearing a good deal in the night, although he had not spoken for seven years before. I went up to him and said, "Henry, why haven't you talked all these seven years?" He said, "My God, doctor, a man ought always to think before he speaks." (Laughter.) Now I think, in hearing these two papers, so elaborate and covering the entire subject, and only hearing one of them partially, I ought to think a long time before I speak. In fact, I have very little to add and can not add a great deal more than my personal experience in regard to treating drug habits.

A young man came to me the other day, who is a banker, by the way, and has a good deal of money, and he said, "Doctor, I will give you five thousand dollars down if you can give me assurance of curing me of the alcohol habit—the whisky habit." "Well," I said to him—he is only about 35 years of age—"young man, go sell all thy houses and give to the poor, and then go to the first lamp-post on the corner and hang yourself, because I can not enter into any such a compact." Neither do I believe any kind of medical treatment will cure a habit that purely depends upon a man's will-power and moral character. He might have asked for medicine to prevent swearing or doing some other act. Medicine alone will not do it.

Now, in regard to the cocaine and opium habits: We can not give these patients something that will take the desire away, because we can not change their condition or environment. My impression is, if the government had set off the Isle of Pines, off

the coast of Cuba, as a place where every person might be sent as a refuge, it would have been an excellent thing. I wonder that the W. C. T. U. do not apply to the Government and get a place where people could go and get treatment. Because I do not believe any person will ever get rid of the habit in the environment of his own home. The old Jewish law was that there was a place in the temple where a man couldn't be punished, in the Holy of Holies, or if he put his hands upon the altar. We should have some such arrangement on an island where no ship should come and no missionaries would come (especially the missionaries who are the forerunners of the alcohol and drug habits), because I have failed to cure a single case of the drug habit of any variety, and yet I keep a place for the treatment of such people, but always tell them, "I can not cure you. When you go out and the same feeling comes over you, you will do the same thing." A man told me he had quit the whisky habit for a month or two, but he happened to walk down town and heard the ice clinking in the glasses, and he said, "By heavens, my legs carried me right in." I think that is about the effect environment has upon all classes of persons. They can not resist when they pass a certain point and the habit has become fixed.

Dr. A. E. Sterne, of Indianapolis: In commenting upon the treatment of this condition Dr. Fletcher has accentuated the keynote which ought to prevail in every case of this kind, namely, whether or not the individual has a craving for the drug. If the condition has not gone to the point where the system demands as a craving this drug, these individuals do very well, but after that point not. There is a distinction as to whether a man has a craving for the drug or whether he takes a drink for purely social reasons. In the treatment of these conditions the so-called abstinence symptoms are based upon an acid condition of the system. They are not due so much to the lack of morphine as to the absorption of split products of morphine, namely, morphinic and demorphinic acids which you can find in these patients. To use them would bring about just such conditions as we denominate the abstinence symptoms of morphine. Therefore, let us treat the

stomach—wash it out—and in treating strong men and women you can stop the morphine instantaneously, provided you wash out the stomach or clear it of these products in some other fashion and use alkaline treatment. Then give baths and tonics and build them up, and, above all things, control them. Every morphinist is a liar. If he is not born so he becomes one. You must not trust him even as far as you can see him, but only as far as you can reach with your hand. They must be controlled, and therefore the fallacy of treating them outside of a place where you can look after them, at least until they get over the first stage, that of the craving, and then, possibly, you can do them some good.

DUST—A NEGLECTED FACTOR IN ILL-HEALTH.

BY ROBERT HESSLER, A.M., M.D., OF LOGANSPORT.

Of the many cases, patients, coming to us for advice and a prescription, a number present but ill-defined symptoms of disease. On listening to their statements, and after a more or less thorough physical examination, we may be at a loss for a name for the symptom-complex. For instance: As I write I have before me a letter from an intelligent patient now living at St. Louis, Mo. He says he was told that he had malaria and was dosed with quinine. The man is unusually intelligent and observes bodily conditions; he understands about the cause of malaria and its transmission by certain kind of mosquitoes, and that these are absent during the cold months of the year. He goes on to say: "The symptoms began to return, and today I have felt mean. Had chilly sensations, nose and eyes water, eyes weak and tired; seem to have a huskiness in the throat and muscles over the body seem sore as if I had a cold and it settled in them. I just feel mean—not sick; like to choke some one. Otherwise I feel first-class—bowels open, stomach good—all right except this malaria, cold or whatever it is."

I have heard the term "False Malaria" applied to such conditions by a local physician, an acute observer, but this, of course, is not the name of a recognized disease or the recognized name of a disease.

Then again, we meet with a class of patients who complain in about this wise: More or less continued malaise with mental depression; a sense of constriction in the chest, with distinctly painful sensations, at times radiating or extending to the spinal column and along the extremities. A fullness in the head, often a feeling of dizziness and peculiar noises and headache. At times sensations of heat in the skin, especially of the face and forearm, or a sense

of coldness, or an alternation of the two. The alimentary tract may be deranged and there may be an irritable bladder.

An individual thus affected may have periods when he feels all right—is well. Some get well the moment they go away on a long vacation—and complain as soon as they get back home. Can we call such cases "False Neurasthenia," in line with the term "False Malaria?"

Another class might be mentioned—those who complain more or less constantly of having rheumatism. They ache in the joints and in the muscles of the extremities, in the back, and at times they may ache all over the body. One of my patients frequently uses this expression: "I feel like an old man today; I ache all over." There may be little or no elevation of temperature; the patient may say that he is in good condition otherwise, and that as far as he knows the bodily functions are carried on properly—if he were only free from those rheumaticky pains and aches.

Cases of this kind at times go to some health resort and are "cured" in a few days and are free from pains—then they return home and soon the old trouble comes back. Shall we call this "False Rheumatism?"

Mention might be made of other similar false or pseudo diseases. We all can recall cases that are atypic and can not be properly classified. Some of these cases we can treat lightly and we may not see them again; others return to us again and again. All sorts of explanations may have to be made and all sorts of theories advanced to account for the symptoms. Indeed, I believe that most if not all of us, have at times personally experienced similar symptoms, and where or when this occurs repeatedly we may have reflected more seriously on the etiology, or the cause.

The present writer has been making observations for a number of years, and has come to the conclusion that the dust—that is, town or city dust mixed with dried sputum—plays a most important role in cases like those mentioned above.

The writer has frequently noticed a regular epidemic of such disturbances after the prevalence of a high wind. The approach of cold weather in the fall, with attendant confinement to close and illy ventilated rooms, and the return of dry, dusty weather in

the spring may produce a regular epidemic; every other person may complain in some manner. Some individuals are regularly attacked on a long, dusty railway journey. Some farmers with good health while on the farm get ill every time they come to town on a dusty day. In fact, some individuals can not live in a town or city with any degree of comfort.

I am inclined to believe that the importance of this infected dust is not fully realized, even by eminent writers on diseases. For instance, I have just looked over a description of acute catarrhal rhinitis in a recent authoritative work, in which we are told that the causes are predisposing and exciting. Under predisposing are mentioned the diatheses, such as the rheumatic and gouty, and the uric acid or lithemic state. Then we have a mention of eating too much meat, of living in overheated rooms, of swaddling the body, and that excesses of all kinds predispose to coryza. Under exciting causes we are told of wet feet, draughts, sitting in a cool place with a moist skin; we are also told that the amount of moisture in the air and the temperature require consideration. Now, this is all well enough, but nowhere is there anything said about the infective material in the air, and that in a pure atmosphere all the above predisposing and exciting causes go for naught. I have seen so-called rheumatic and gouty and uric acid diatheses disappear, along with the rhinitis and "colds," as soon as the patient got into a good atmosphere, and, on the other hand, their prompt return on getting back into the dust.

Man in a primitive condition may be said to inhale a pure atmosphere, and in proportion as he lives in communities, with fixed habitations, the atmosphere about him becomes polluted, and nowhere more so than where the habit of promiscuous spitting prevails. We all know that the air we breathe is often badly polluted by the expectoration of persons affected with all sorts of diseases.

Now, the respiratory mucous membranes differ greatly in their resistance to the infective matter in the inhaled air. The average man under average conditions gets along very well; if the amount of infecting matter inhaled is unusually large or the inhalation long continued, there may be more or less disturbance. At either end of the average we have opposing conditions. On the one end

we find the individual who seems practically immune, even under severe exposure; on the other end we find the individual who becomes afflicted, infected, under even a slight exposure.

Among immunes, or rather, I should say, among those least susceptible, may be classed street sweepers, who inhale an immense amount of dust from day to day, and with seemingly little bad effect; railroad conductors on smoking cars come under the same head. The law of the survival of the fittest explains why this is so—a man unusually susceptible to the dust would not long fill such a position.

It is a common observation that during the prevalence of dry, windy weather, and for some time thereafter, many persons complain of wandering aches and pains throughout the body, in some a coryza and catarrh is set up, some complain of lumbago or pleuritic pains; in fact, a whole train of disturbances may follow after the subsidence of the dust.

Now, the strange part of it all is that the evil influence of the dust inhaled is scarcely recognized—not at all by the laity and only dimly by the medical profession. I make this last remark after due deliberation.

A certain class of cases subject to dust infection—those in whom the rheumatic symptoms prevail—are more or less fully aware of changes in weather conditions affecting their own condition—only they misinterpret them. For instance, after continued calm weather, with little wind movement and little dust in the atmosphere, a storm approaches, heralded by the prevalence of a high wind, often for many hours in advance of the rain. The air becomes filled with dust, it is inhaled of necessity, soon the effects are noticed, and the rheumatic promptly ascribes his aches to the change in the weather, to the storm that is coming, to the wet weather on the way. The dust is not considered, not even when the pain subsides during continued wet weather.

During the prevalence of continued dry, windy weather some of these patients ascribe their suffering to the "dry winds," and their belief is strengthened when they begin to feel better after the rain has arrived. We all know that the air is pure after a rain.

The real reason, the dust in the air, is taken account of by very

few. Men have to have their attention called to these things. A number of rheumatics have told me that after hearing this explanation they feared the wet weather less than formerly, but, on the other hand, became afraid of the dust—and in proportion as they were able to avoid the inhalation of dust they would get along in comfort. Now, do not understand me to say that all rheumatics will be thus influenced. The kind of cases I am speaking of are those who are subject to dust infection.

If we call for the sputum of a patient during or after the prevalence of dusty weather, we are apt to find present much glairy mucus, colored more or less dark by innumerable dust particles. We will also find little bits of yellowish or greenish matter, and this under the microscope will be found to be made up of polynuclear leucocytes, and in and among them various kinds of bacteria. This purulent matter is evidence of an infective process that has taken place and is of frequent occurrence in the inhabitants of cities. As a rule it subsides promptly when the amount of dust inhaled is reduced to a minimum.

It is evident that if the body is not in the best physical condition more than a purely local disturbance may follow, and along different lines, as already mentioned. Even with the body in good condition, an unusual exposure, as a trip down town on an unusually dusty day, may be followed by illness.

The writer now desires to make a brief mention of some cases, selected from a large number, to show the influence of inhaling dust, that is city dust, or dust mixed with sputum.

G. T. Well developed farmer boy of 18 years. Typical history of dust infection. Every time he goes to town, or, rather, returns from town, he feels feverish, followed by headache, soreness in the chest and at times in the larger joints, with profuse expectoration.

Excepting much hypertrophied tissue in the throat, due to repeated inflammation, I could detect nothing wrong about him. He seemed to be a picture of health. We discussed the nature of the difficulty and I advised him to remain away from town or to go only on wet days, when there was no dust. He has since acted on this advice and gets along in comfort.

This was the only case, excepting another farmer, where the patient himself was able to recognize the dust as the one factor in bringing on the illness.

Mrs. S. Middle-aged housewife. History of frequent headache, vague wandering pains in extremities and chest; at times the pains are severe, accompanied by a disturbed stomach and an irritable bladder; attacks last a few days. Says she gets sick after going to church or to a party, and also gets sick on sweeping in the house. This patient dimly recognized the influence of the dust, as I soon learned and without asking any leading questions along the line of dust infection. She says that formerly she could not take a ride over a dusty road or in a street car without getting ill; she goes to church or to a party only at times when all the doors and windows are open, and even then she does not always escape.

This case belongs to that class of women who regularly have a "Blue Monday," the result of house cleaning on Saturday and attending an illy ventilated church on Sunday. After pointing out the source of the "blueness," many women get along in comfort without any special medication.

Mrs. H. Housewife of about 26, lives in the eastern residence portion of the city, has the appearance of being "run down." Came to me early in March with a history of various disturbances; pain in the back, wandering pains in the body, headache, deranged stomach and bowels, with a discharge of much mucus at times. Has a sickly yellow color. Claimed she has had all sorts of experiences with physicians and was now almost discouraged. I suggested a systematic examination, to which she agreed, with the following results:

Bodily development good; excepting tenderness in chest and abdomen and along the spine, the physical examination was practically negative. Red blood cells reduced to 3,800,000; hemoglobin to 60 per cent. Gastric fluid after a test meal contained much mucus, small amount of HCl present, also lactic acid, yeast and some pus. Sputum mainly mucus, with some purulent matter, full of bacterial life, but no tubercle bacilli. Urine very concentrated, acidity and phosphates high. Pulse tracing normal, but nervous and influenced by the respiration.

I should have stated above that this patient wore a long, trailing dress and came down town frequently.

After further questioning the patient and after a study of the results of the examinations she was advised:

1. To shorten her dresses to keep them off the ground.

2. To stay at home; if compelled to go down town to go only on wet days.

3. To use water more freely and to reduce the amount of animal food.

4. For the excessive amount of mucus in the throat and stomach, she was advised to gargle a very dilute salt and baking soda solution and to drink a glassful, hot, half an hour before meals.

5. She was placed on a laxative, organic iron preparation to improve the condition of the blood; the dose to vary according to the condition of the bowels.

This case began to improve at once. The bodily functions became normal, color came to the cheeks and the former disagreeable symptoms disappeared. The only time she complains is during the prevalence of dusty, windy weather, and then only of the wandering pains. The excessive secretion of mucus from the respiratory and alimentary tract has almost ceased.

Recently I explained to her fully how the dust had and still does affect her, and this has made her more cautious. She is now firmly convinced of the influence of infected dust.

In the following case the alimentary tract bears the brunt of the attacks. The case is that of Miss B., age 25, farmer maid. Her past history was obtained chiefly from her employer, an intelligent farmer's wife.

Has a brother and sister, both well and not subject to colds. Parents dead. Mother was affected like her (the patient); would get along in the country, but would get sick on coming to town, and when later on she removed to town she was ill continually, colds, stomach disturbances, and finally died of consumption.

Miss B., the present patient, lived with her mother until the age of 8, then for two years was at an orphans' home, where she had what was pronounced to be scrofula. At the age of 12 she was

taken to the farm by her present employer, as already mentioned. She could not go to school, because her neck would swell and she would feel bad. For the past five or six years the neck has ceased to swell, but at times her stomach would become deranged.

It was soon noticed that after she visited in town she would complain of feeling tired and of aching on getting back home, with pain up the nose and headache over the eyes and back of the head. Later on—that is, beginning five or six years ago—the stomach would become deranged after a trip to town. Usually she would begin to spit on the way home and get sick, with a sense of fulness or filling up, followed by vomiting and severe pain during the night. For the last year or two the vomiting would appear on the following day, and she would be sick all of that day; but by the next—the third—day, she would be well again, only weak.

I was informed that all sorts of opinions had been passed on her condition and all sorts of medicine had been given. The lady wanted to bring the girl to me, in the hope that I would be able to find out what was wrong and if possible suggest a remedy.

It is perhaps needless to say that I at once made up my mind as to the nature of the difficulty. Dust. However, I thought there might be some unusual stomach condition, and so I advised the use of a test breakfast and a systematic examination.

The patient came in two days later, according to appointment, accompanied by her landlady. She seemed to be a well developed and healthy looking country girl. Now, it happened that it was a rainy day when she came in, and I questioned her about wet weather, and she told me she came to town only when the weather was fine, and excepting for this appointment she would not have come on a day like this. I expressed a hope that she would not get sick this time, but without giving any reason. She returned home at once, after swallowing the stomach tube, which brought up a slightly greenish colored fluid. A urinary examination made at the same time proved negative.

The patient came back the next day and at once remarked that she did not get sick on the way home, and that this was the first time that she had been to town without getting sick. This was

gratifying news—and incidentally confirmed my views on the causation of her illness.

I questioned the patient and she confirmed what had already been stated by her landlady. She says she does not go to church or Sunday-school, because she always gets sick afterwards. She gets along comfortably at the house, at home, excepting at times of company for dinner, when the distressing feelings in the nose, forehead and back of the head come on; if there is a large company the after-effects are the same as going to church or of a trip to town—that is, vomiting will come on. Her landlady suggested that perhaps it was the noise that made her sick, to which the girl dissented, and remarked about coming to town yesterday, and that it was noisy, and that she did not get sick.

I now explained my views on the influence of dust; that is, dust due to human activity and mixed with sputum (excluding dust of country roads), of dust carried into rooms by trailing dresses and of poor ventilation. I then advised her to come to town only on wet days and not to stop where people are massed together. She saw the point at once and readily assented to my views.

The patient of course expected some prescription to help her, and she was given a prescription for a tonic. What to do for such cases to enable them to permanently overcome this susceptibility to the dust is another question. It is a question that I shall not take up at present.

Another case which I would like to mention in extenso is that of a young man of 24, who ordinarily would be regarded as a neurasthenic, but whose difficulties are due wholly to the influence of polluted air.

I may say that occasionally we meet with intelligent patients who do not expect impossibilities from a physician, and who fully realize the importance of prophylactic measures, and with whom we can discuss conditions freely.

The patient referred to belongs to this class, and at my request he has written a history of his case, to which he has appended some observations on dust and how it affects him.

Case of Mr. C., as written by himself, May 16, 1904:

"Age at this writing, 24 years.

"Family: All long-lived—no tuberculosis as far as can be traced. Mother and mother's family both subject to colds and nose, throat and stomach troubles. Mother always extremely nervous and exhausted after such attacks. This condition also occurs in subject.

"First appearance of complaint: Up to about five years of age no inflammations or cold troubles of any kind. Then a great susceptibility, always beginning in respiratory organs and canal, and ending in disturbed stomach—and muscular exhaustion. End in prolonged cough.

"Conditions when in school and the vacation periods: Up to the time of starting to school no evidence of these symptoms; after that colds very frequent—growing less frequent and ceasing during summer months of vacation. Several vacations spent in country, where no disturbances occurred. Recurrence of disturbances upon continuing school sessions.

"At 18 years leaves school. Office work: At 18 leaves school and takes office position. At first this position was not confining and allowed of one-half time in open air, during which time no great disturbances occurred. Then work became more confining and finally inside exclusively. Cold conditions became aggravated immediately. After about two years of this work subject was compelled to quit work entirely for over eighteen months, during which subject suffered from continued colds, excessive nervousness and general weakness. This condition was owing partly to confinement and partly to overwork. About three months of the last part of this eighteen months of enforced idleness were passed in the country. Those three months were more beneficial than anything else toward improving condition.

"Occupation since 18: Both indoor clerical work and outside work—no manual work. Habits sedentary, body sluggish. General condition pretty good until increased application to inside work—then condition became worse. Overwork and confinement to quarters in which practically no ventilation was possible finally produced same condition as before—continued and frequent colds, followed by stomach disorders and nervous exhaustion.

OBSERVATIONS.

"1. Office in which subject was occupied (was) below level ground, with no facilities for ventilation; consequently dust and spittle deposited or blown into the room was held, and the air was never more than a slight per cent. pure. Whenever subject's work confined him to this place condition became rapidly worse.

"2. Dust: It was observed that on clear, sunny days condition very much improved, but two or three days of dusty weather again produced first nose and throat and bronchial irritations, and then stomach disorder, accompanying or following the cold condition; that disorder followed on exposure to blowing dust or indoor confinement with impure air. When at home subject experienced no such disagreeable sensations as in the down-town districts and districts where impure air was the irritant.

"3. Railway trains: Two very severe colds can be traced directly to confinement for three hours or less in railway coach—in both cases all windows were closed and cars full of people—some of whom spat upon the floor frequently.

"4. It has been observed that overheating in impure air will always produce cold condition.

"5. Conditions always worse after attending public gatherings, meetings, etc., especially where the majority of the people assembled are men. At one political meeting especially, where expectoration was unusually frequent, inflammation began before subject even left the room.

"6. Subject was formerly told by physicians that the nervous exhaustion was produced *entirely* by overwork, but it has been observed that this nervous condition invariably accompanies a cold or respiratory or alimentary inflammation.

"7. During the sweeping and after the sweeping in the office where dust has been deposited for some time a condition of cold occurs, but not invariably."

The above notes were copied on the machine just as they were handed in.

In conclusion, I wish to say that this paper is a general statement of the subject of the influence of dust on man. The subject is a large one, and different phases have been taken up and will be

taken up in the future. I may add that I am more and more impressed with the importance of pure air in the welfare of man and that impure air plays a great role in the production of diseases and everyday ailments.

DISCUSSION.

Dr. Roscoe H. Ritter, of Indianapolis: The mode of the transmission of infectious diseases has long been known, but its full significance is just now being appreciated. Dr. Hessler has gone a little beyond the accepted influence of dust and states propositions which he has very well proven. No better commentary on the true influence of dust can be made than that presented by the statistics of the New York Street Commissioner. It has been asserted and proven beyond all question that from one-fifth to one-third of the street sweepers of New York City have been infected with tuberculosis, and it has been proved that five years is about the average life of street sweepers in that work. In view of the fact that these employes are carefully examined by the public health officers and found to be in perfect health before they are employed, certainly some significance is attached to the occupation. In contrast with this is the mortality of the street sweepers of Berlin. They show the least mortality of any of the laboring classes of that district. There is only one way, perhaps, in which we can account for that. Perhaps there is more spitting in America than in Germany, for the Americans are spitters; but that will not account for it entirely. In German towns the streets are thoroughly wet and swept by hand very carefully, and no dust is raised, while in New York no effort is made to do that except imperfectly.

This is suggestive of another fact: We attribute hay fever cases to dust and pollen of certain plants. Now, patients go to northern districts, where they have the same plants, and escape from the symptoms, so that the influence of the dust in the two localities can not be overlooked. There is another fact perhaps which all of us have noticed, and that is the rapidity with which persons fail after coming from the rural districts to town. Within two years a patient came to town with latent tuberculosis and

developed rapidly-advancing tuberculosis after entering the town. We can not ascribe it to faulty nutrition, because the manner of life was, if anything, easier, but he developed bronchial symptoms soon after coming to town, and the dust and its organisms were undoubtedly the exciting cause of the pulmonary disturbance. Certainly, then, dust is a direct infecting agent, and does produce irritation of the bronchial tubes, which of course lowers the resistance and makes a favorable breeding-ground for these vegetable organisms.

Dr. J. N. Hurty, of Indianapolis: There are some considerations that point to the conclusion that dust is a great factor in the spread of typhoid fever. The statistics of the United States show that the number of passengers carried over the railroads of the United States amount to 80,000 per mile per annum. It is also shown that in every 1,000 people an average of five, perhaps only three, carry typhoid infection in their dejecta. In traveling on a railroad you know how the dejecta are disposed of. Out of 80,000 people 4,000 travel over the various railroads in the United States and discharge the infection, and discharge it frequently. Now, to assume that each mile of railroad, if averaged up for town and country, would become infected by 4,000 people is not a violent assumption at all. In the fall, you will remember, when people are coming home in droves from their summer vacations, the dust follows the cars—just clouds of it—and we know also that typhoid is an autumnal disease.

The statistics of one railroad—I do not want to disclose the name of it at the present time—that has a very progressive president shows that the men who work along the line and the track hands suffer enormously from typhoid in the fall. Now, if water is a great carrier of typhoid—and undoubtedly it is—why is it that we have to wait until fall to have it? Why doesn't the water carry it one time as well as another. Typhoid will resist cold, and also a high temperature. Why wait until fall to have an increase in typhoid? It seems more probable, from these few considerations and observations, that typhoid is spread not a little by the dust.

CANCER OF LARYNX.

BY W. H. WILLIAMS, M.D., OF LEBANON.

Permit me to present to you, from the standpoint of the general practitioner, a brief investigation of a subject that is all the more interesting because of its rarity. "Cancer of the larynx" is seen by but few men in the average length of professional life. In the gathering of statistics the number of cases does not lengthen into the scores as do the other forms and locations of malignancy.

From the standpoint of the patient we can, indeed, be grateful that this condition can be classed as rare, but we are forced to acknowledge that rarity does not temper its power of destruction when once its talons are fastened upon its victim. The very name suggests to us at once the formidable enemy with which we have to battle. Just why it should implant itself in this particular part of the body, or any other, for that matter, and just what is the commanding figure of the group of cells that makes up the neoplasm, our best pathologists and bacteriologists have been thus far unable to tell us; but we do know that the growth is always primary or secondary to a similar growth in some other part of the body; that heredity is an important factor in most cases; that any occupation or habit that carries with it the necessity of frequent inhalations of dust, fumes from chemicals, smoke from burning buildings, or tobacco, or any irritating substance that will keep the larynx in a state of constant chronic inflammation, is very conducive to a beginning of this form of neoplasm; that it is more common between the ages of 40 and 60, and is most frequent in men in the ratio of three and one-half to one.

The growth is usually epitheliomatous or sarcomatous and is in the ratio of five to one in favor of the former. The primary is generally found on the ventricular bands, vocal cords or posterior laryngeal wall, and is of slow growth and late involvement of the

cervical glands, especially when in the latter location. The secondary is rapid in its growth and early involves the surrounding lymphatics and tissues, and soon closes the early career of its victim.

The symptoms of a malignant growth of the larynx will depend much upon its location. If within on the vocal cords, ventricles or ventricular bands, a slight hoarseness will appear early and rapidly increase with the development of the growth. Shortness of breath will accompany the beginning of the hoarseness, and grow more difficult with the progress of the disease. If the growth is at the entrance of the larnyx on the arytenoid cartilages, aryepiglottic folds or epiglottis, the change in the voice, if any at all, will be late in the disease. Cough is present, but usually does not begin until ulceration is present. Expectoration in the beginning is but little changed from what you would find in a case of chronic laryngitis, but becomes mucopurulent with the beginning of ulceration and later is mixed with necrotic tissue and blood and is accompanied by an extremely offensive odor. Deglutition is painful from the beginning of ulceration and sometimes before. The pain at this and other times usually radiates through the neck to the pharynx and to the ear of the side affected. Many times the pain will come in paroxysms, after which the external auditory meatus and rim of the ear will be extremely tender to the touch for some time. Cancerous cachexia will be present late in the disease, but appears much later in this than in other locations of malignancy.

A growth in the larynx may be benign or malignant and often requires the use of the microscope to determine its character, but when it has reached the stage of ulceration it is of a certainty either tubercular, syphilitic or malignant. "When the ulceration is on the upper surface of the epiglottis it is always syphilitic."—(Musser.) Heredity is worthy of consideration in any of these conditions that may exist.

Tubercular laryngitis is characterized by a very pale mucous membrane, with masses of dilated blood vessels here and there. There is always a history of cough and expectoration of mucus for several weeks before the physician is consulted. The aryepiglottic folds will show a pale, pear-shaped edematous swelling obliterating

the little nodule that marks the location of the cartilage of Wrisberg. If pulmonary tuberculosis is present, almost any thickening of the mucous membrane in the larynx can be taken as evidence of the beginning of the disease in that location. If ulceration is present the ulcer, in outline, is irregular, shallow, covered with thin gray or yellow exudate with marked edema on the side of the ulcer; tubercle bacilli will be found in the secretions. Hoarseness and painful deglutition will be present, and after ulceration has begun an abundance of thick, tenacious, ropy, glairy mucus will cause the patient extreme annoyance.

In syphilis a hyperemic, mottled appearance of the mucous membrane will be seen, with mucous patches here and there and at times slight ulceration. The necrotic areas present a faint, milk-white, nonelevated exudate that either blends into the surrounding tissue or is surrounded by a bright red zone. The voice is usually somewhat hoarse and the mucous secretion is sufficient to require frequent clearing of the throat. Deglutition is not painful unless the ulceration is on the epiglottis or aryepiglottic folds. Careful inquiry into the history of the case with search for evidences of primary lesions will be of assistance in the diagnosis. Malignant growths in the early stages and a simple inflammation of any form are extremely difficult of differentiation and can be positively decided only by a section under the microscope, but to the experienced eye, if the examination shows a dark red or purplish, uneven growth on the vocal cords, ventricular bands, posterior laryngeal wall or aryepiglottic folds, with a hard resisting surface that bleeds easily when touched, with fixation and loss of motion of the muscles of the affected side, and if in the stage of ulceration a deep, ragged ulcer with a gray, green or black slough and a train of symptoms as have been previously described, one will have but little trouble in eliminating the other forms of ulceration mentioned and establishing a positive diagnosis of "cancer of the larynx." The diagnosis once established, what you can say to your patient relative to the final result will depend much upon whether the growth is primary and intralaryngeal or secondary, involving the epiglottis and aryepiglottic folds. In the primary variety much depends upon the amount of involvement at the time of discovery. If seen early

and the involvement is only on one side the prognosis is much better. For this reason a patient past middle life complaining of hoarseness should have his larynx carefully examined with a good light and laryngeal mirror, and if suspicious conditions are found should be placed in the hands of one familiar with the appearance and treatment of such cases. Secondary involvement is always rapid and usually ends in septic pneumonia or sudden hemorrhage. The primary form, if not interfered with, is usually fatal in from one to three years.

The treatment depends entirely upon the kind and stage of development in which the neoplasm is found. A primary cancer, if seen early, is purely a surgical disease and carries with it some hope of permanent results. Even after both sides of the larynx have become involved some few patients have been able to withstand the complete removal of same and recover. The fact that the connections between the lymphatics of the larynx and those of the sides of the neck are very poor, make it possible to reach this degree of success in surgery of this particular region. In advanced primary and all secondary cases the treatment can only be palliative. If edema is great and suffocation threatened, tracheotomy is done for temporary relief. Opiates should be given as freely as required to relieve all pain. If the patient is unable to take sufficient food by the mouth to relieve the pangs of hunger, rectal feeding should be resorted to.

Antiseptic and deodorizing sprays should be used as freely, as the patient finds comfortable. These should be followed by insufflations of pain-relieving powders. Perhaps the words of Bishop cover best the condition of the hopeless cases when he says: "From a humanitarian point of view, if it were justifiable under any hopeless circumstances to relieve a fellow-being of his misery and despair by the merciful production of easy death, cancer of the larynx is the case. Death constantly stares the victim in the face, and, what is worse, like the burning coal in the eye of Cyclops, pain, in all is variations and refinements of torture, converts the patient's world into a chamber of horrors. No words can depict the agonies of these coughing, choking, strangling sufferers."

I append a short history of a case that recently came under my observation:

Mrs. G., aged 57, consulted me February 2, 1903, in reference to some ailment of the throat. She was the mother of three children, all living; was naturally of a frail makeup, but had been more so since the menopause, which occurred at about the usual age; no history of tuberculosis or cancer on either side of her near kinship; gave history of frequent croupous attacks seven or eight years previous to the date mentioned; following this there had been more or less redness of the throat at all times, for the relief of which she had used various sprays and gargles with but little success. Three years before date of consultation she noticed a gradual loss of the proper use of the throat in swallowing food or drink, and at times a piece of meat or other tough food would become lodged in the throat and would have to be removed with the finger. Severe paroxysms of coughing, followed by extreme exhaustion and dyspnea, were easily brought on by being in a close room or dusty atmosphere. The glands at the angle of the jaw showed no enlargement, no cachexia, but little change in the voice from normal; bowels constipated, marked with but little desire for food. Under a good light the throat and larynx gave the usual appearance of a chronic laryngitis, but was hyperesthetic to the extent that a complete examination could not be made. A few days later a second examination was attempted with but little better success. Two weeks from the date of the first examination the throat was sprayed with a 5 per cent. solution of cocaine and the examination completed, with the result that the left aryepiglottic fold was found slightly edematous with a small ulcer, with warty-like projections around its edges, located near the nodule that marks the location of the cartilage of Wrisberg. With a knowledge of the history of the family and the symptoms present tuberculosis and syphilis were eliminated from the case and a diagnosis for cancer made. The constipation was corrected and she was given Donovan's solution for the general health, with no noticeable improvement. The throat was cocainized daily and the ulcer touched with lactic acid, beginning with 20 per cent. and increasing to 80. This was followed with a spray of 1-5000 adrenalin solution and dusted with

orthoform. This kept the throat reasonably comfortable, but was no hinderance to the ulcer, which steadily increased in size. Slight fever developed from sepsis; expectoration more profuse, mixed with blood and necrotic tissue. Cachexia came and the patient was no longer able to leave her home. Frequent attacks of nausea were relieved by drop doses of chloroform. Ten per cent. camphor menthol in lavolin, used as a nebula, was a source of much relief. The local treatments were lengthened to alternate days, and the constitutional treatment changed to various prepared foods, liquid peptenoids, malt, etc., to sustain the strength. The cervical glands enlarged slightly and the tenderness was markedly relieved by applications of antiphlogistine. Rectal feeding was resorted to as deglutition became more difficult. One-twelfth grain Heroin hydrochlorate every three to four hours was all the opiate that was required at any time to relieve the pain. Articulation became more difficult as the laryngeal muscles became more extensively involved. The voice changed but little until very late in the case. The ulcer spread backward and then upward on the posterior pharyngeal wall until by pressing the tongue down slightly it could easily be seen without the aid of a throat mirror. Death came just six months from the date of the discovery of the ulcer.

DISCUSSION.

Dr. L. F. Page, of Indianapolis: The distinction the essayist makes between intrinsic and extrinsic tumor of the larynx is very important in that these cases that are extrinsic are not so operable as the intrinsic. We mean by intrinsic tumors those located on the vocal cords or the ventricular bands or below. The extrinsic are those confined to the epiglottis, the region about the base of the tongue and the epiglottic folds. The region about the base of the tongue is very richly supplied with lymphatic glands and tumors in this region are not so amenable to operative treatment as the others. In the last two years I have had three cases. Two were advanced cases and I used all the applications that gave any temporary relief, did some intralaryngeal operating to relieve the difficulty in breathing, but it was only a short time until these cases succumbed. The last case is that of an old gentleman who is here

this afternoon, 72 years old. He came to me a year ago, as soon as he began to suffer from dyspnea. He had the classic symptom of pain in the ear. I tried to remove a portion of the growth located in the anterior commissure of the larynx, but got only a portion of it. The tumor was so hard the snare wouldn't cut and ordinary McKenzie forceps were not sufficient to remove any part of the tumor. If the case is specific they yield to the iodide treatment, and in some cases of cancer the iodides arrest the development of the growth for a short time. But in this case it was absolutely of no avail. I could get no specific history. As the tumor was confined to only one side of the larynx, I decided to do an external operation. The operation in these cases is a partial laryngotomy of a section or a complete extirpation of the larynx. The laryngoscopic appearance was such that the growth was confined to one side and subglottic, and possibly after opening the larynx we would find only one side affected. We first did a preliminary tracheotomy and found the cartilages of the trachea ossified, rendering this part of the operation somewhat difficult. The rest of the operation was not so difficult except for the bleeding. They are always bloody operations, and this was annoying. This tumor was sent to the pathologist and passed upon as a case of carcinoma of the larynx.

PATENT MEDICINES.

BY H. J. HALL, M.D., OF FRANKLIN.

Of the whole amount of drugs taken as a medicine in the United States, fully one-half is taken in the form of patent or proprietary medicines. This I ascertain by inquiry among a large number of physicians, of druggists, and my own observation.

During the recent Cuban War our Government laid a tax on all proprietary and patent medicines manufactured in the United States. In this way it was ascertained that the annual sales of this class of drugs amounts to $60,000,000, in round numbers. It is also ascertained in the same manner, and by keeping a record of the patent and proprietary medicines advertised in the newspapers, that there are about 2,000 firms or men in the United States putting out this class of drugs. This shows the average income of these patent medicine men to be $30,000 annually in the United States.

The number of physicians in the United States varies but little each year from 200,000, and from the best authority obtainable the annual income of all the physicians in the United States is $120,000,000. This makes the average income of the doctors in this country each year only $600. Some who have given attention to these statistics have made the annual income of physicians a little more than this, but none, I believe, have placed it so high as $800 a year. Consider it a moment, gentlemen—the average income of physicians in this, the best country on earth, from $600 to $800 a year, while the average income of the patent medicine man is $30,000 a year. We have some important conclusions we might give here, but let us wait till we add more testimony.

Of the 30,000 different kinds of patent medicines manufactured in this country, 1,075 are known as bitters, stomachics or cordials; and into each of them entered alcohol from 15 to 50 per cent.

Six hundred ninety were for coughs and colds, and nearly every one of them contained opium in varying amounts. One hundred twenty were sold for relief of pain only. One hundred sixteen contained cocaine, 285 are "quick relief cures," nearly every one of which contained opium. Ninety-one compounds for asthma contained opium and caffein.

The Massachusetts State Board of Health recently had fifty proprietary medicines analyzed and found that they contained from 7 to 47 per cent. alcohol. Most of the beef tonic preparations have from 15 to 19 per cent. alcohol, a larger per cent. of alcohol than most physicians suppose. Recently a representative from one of our large drug houses called at my office and left samples of his firm's beef tonic. In comparing it with a similar preparation of a rival firm, he assured me that their tonic was a preferable preparation, as it contained only 21 per cent. of alcohol, while the other preparation of the other house contained 23 per cent. of alcohol. Many of the malt extracts with which our physicians the country over are supplied vary but little in their constituents and effects from the beer found on the general market. The sarsaparillas that we all see so extensively advertised in the secular press contain from 13 to 26 per cent. of alcohol. Of seventy specifics advertised to cure the opium, alcohol or cocaine habits every one of them, as shown by one State chemist, with only one exception, contained opium, alcohol or cocaine as the chief ingredient.

One nostrum advertised as a positive cure for the opium, alcohol or cocaine habits, that was said to be free from opium or other narcotics, was analyzed by the Boston Board of Health and found to contain opium and chloral and 19 per cent. of alcohol. Another of the State Boards of Health examined, by analysis, twenty of the so-called opium cures and found every one of them contained morphine in variable quantities. Most of the "instant relief" for colds contain cocaine in such quantities as to endanger the person who takes it in no small degree of forming the cocaine habit. The British Medical Journal recently gives timely warning against the use of coca wine for the fatigue that follows an overworked nervous system.

Some time ago it was advertised that a doctor, traveling in Florida, had discovered a plant whose juice was an antidote to snake bites and also a cure for the opium habit. The well-known chemist, Prof. Lloyd, of Cincinnati, analyzed it and found it composed of morphine and salicylic acid dissolved in a solution of alcohol and glycerine.

One of the good physicians of Indiana, who was a personal friend of the writer, had freed himself from the opium habit, but was brought completely under the narcotic habit again by the use of the well-known preparation of celery compound. For a time he took three or four bottles a week of this preparation. Even this good doctor was ignorant that it contained over 21 per cent. of alcohol.

A physician, who stands high as a member of the American Medical Association, was recently called in counsel in a case of multiple neuritis. In search for the etiology of the condition, they ascertained that the patient, according to his personal testimony, was a total abstainer and a strong temperance advocate. Further investigation showed that he was taking a patent preparation, prepared by a retired clergyman, called the Balm of Gilead. Analysis revealed the fact that this balm was composed of 70 per cent. of alcohol. Yet he was ignorant of the fact that he imbibed more alcohol daily than the average intemperate man.

Another and even more striking case: A young woman suffering from neuralgia and rheumatism, saw the advertisement of a very promising preparation for rheumatism. She purchased it and became addicted to the morphine habit. She spent over $600 for this drug know as Feelig's Rheumatic Cure. Each bottle contained five to six grains of sulph. of morphine. In the 1,000 bottles she had used she had taken between 500 and 600 grains of morphine and become an opium inebriate. When she realized her condition she made several heroic efforts to break her bondage, which she finally succeeded in doing with the help of a careful physician.

Some proprietary medicines do not contain harmful drugs. For example, a preparation that was quite extensively advertised a few years ago contained nothing but granulated sugar. Still it sold at

$1 an ounce. Another preparation, extensively advertised as a cure for consumption, showed by analysis to contain water slightly colored by red wine, with enough muriatic acid to give it a slight acid taste. Other examples could be given showing that some of these lauded preparations in the public prints are perfectly inert as far as having any influence on disease is concerned. And the honest thing to say of them is, that they are deceitful frauds. There are certain characteristics about patent medicines that should enable all physicians and many more of the laity to diagnose these fraudulent and dangerous nostrums with but little difficulty.

First. There is nearly always a mystery about its origin. Some remarkable person discovered it, at great cost, under peculiar circumstances, in a foreign country. Most of the discoverers and originators are fictitious personages—"Grand, gloomy and peculiar, he sits on his throne a sceptered hermit, wrapped in the solitude of his own originality."

Here is an example of how a patent medicine generally has its origin: It is from a circular sent out advertising an opium cure. A retired clergyman, the victim of the morphine habit, discovered in the West Indies, on a moonlight night, accidentally, a fruit of which he partook. The result was immediate recovery from the habit. This circular stated that now he gave his life and time to his fellow-men who were unfortunate victims of this terrible habit. No charges made only for actual cost. Examination revealed a poor solution of alcohol and nutmeg. The bottle and its contents were not worth five cents, commercially; the price, however, was $5, expressage C. O. D.

Second. The ingredients or composition of the remarkable remedies are not given nor easily obtainable, and all possible means are taken to prevent analysis and have the nostrum remain a secret remedy. Remove the mystery of its composition and the delusion vanishes.

Third. There is always a list of so-called first-class testimonials, fictitious or otherwise; if possible, however, of respectable—and may be influential—persons, who are willing to stand sponsor for this bastard of illegitimate medicine. Among the testimonials

added to these patent medicines are generally the names of some Revs. and D.Ds. Whenever I see a preacher's name attached to a medicine, it is a sure sign to me that it is a fraud.

Fourth. There is always a slap at the regular profession—as, doctors had given the person up to die, avoid large doctor bills, the doctor's failure to cure and their jealousy of such a great medicine is the reason why the doctors oppose patent medicines.

Fifth. An attractive and original name, that will kindle and appeal to the imagination.

And last, but not least, extensive and attractive advertising with lying circulars, in secular and not infrequently in the religious press, and in the cheaper and poorer grade of monthly journals, thus metaphorically fishing in all waters where the ignorant and credulous public can be caught.

Why this remarkable use of patent medicines if they are harmful? Why do the people of the United States pay annually on an average of nearly a dollar apiece for these false medicines, if they form dangerous narcotic habits, as they undoubtedly do? Let us record two or three reasons: First, the active drug in most of these patent medicines is opium, cocaine or alcohol or some other narcotic, whose influence is to benumb sensation. The sufferer *feels* better while he is under its influence, so believes he is better, and is generally ready to so testify. Second, there are quite a number of people who imagine they have diseases which they do not have. As trained physicians occasionally err in diagnosis, it is not strange that the laity should do so. Such persons are generally ready to declare that a certain remedy cured them. Third, many cures are attributed to drugs when in reality nature does the curing. And in reality most of the testimonials for these deceptive medicines are secured by over-persuasion, and in many cases by downright falsifying.

What may be done to remedy the evils resulting from the use of patent and trademark medicines? First, primarily a campaign of education should be begun. The tocsin of alarm sounded and public apathy should be aroused. The forces to accomplish this are the rostrum, the pulpit, the members of the medical profession; the press (medical, secular, and religious), by timely articles,

should help save the ignorant and thoughtless from the result of their folly. A few days ago I carefully examined a leading religious paper that has a circulation of over 60,000, and of the ninety advertisements in that paper, fifty of them were patent medicines. A splendid example of a religious paper trying to serve God and man. Second, the Government should have a salaried chemist in each State, whose duty would be to analyze all patent medicines suspected to contain injurious drugs, and refuse to allow patent or proprietary right to be taken out for such medicines. This in connection with a law such as they have in Germany and most other European countries, requiring the amount of each ingredient be placed on the bottle. This would lessen the evils to a large degree. Third, all institutions for the care and treatment of those addictetd to the opium, alcohol, cocaine and other kindred drugs should be under the supervision and inspection of a commission, which should consist of experts in this special field of medical practice.

A PLEA FOR A MORE EXTENDED USE OF THE ACTIVE PRINCIPLES OF DRUGS IN THE PRACTICE OF MEDICINE.

BY DR. M. A. BOYDEN, OF ANDERSON.

When we contrast our knowledge and the facilities at our command today with that of even a half century ago we are amazed at the great improvements that have been wrought; and yet we may safely assert that the science of Materia Medica and Therapeutics of today is but an infant in swaddling clothes. I believe you will all agree with me in the statement that it is less understood than any other branch of medicine.

While I am far from being a pessimist or therapeutic nihilist, yet I will venture the assertion that no one can fully explain the philosophy of the physiological action of even a dose of atropia. If this be true of the alkaloid or active principles of a drug, what must be said of the crude drug itself, that may contain a half dozen or more active principles whose action are often diametrically opposed to each other? We have a fair working knowledge of the action of most of the alkaloids, but if our knowledge is not complete we have at least the assurance that by giving them alone we have only to reckon with that action whose effect we are seeking and of which we are reasonably sure, and not to take into account the action and effect of other principles that might be antagonistic to the one desired, thus rendering our efforts fruitless in many cases if not actually resulting in damage to the patient.

It is, however, only within the last decade or so that the virtues of alkaloidal medication, with its superior advantages over preparations, have become generally recognized; while their endorsement and employment is becoming more ubiquitous every day.

After we have determined on the drug indicated we select the

active principle whose effect we desire either in the form of an alkaloid, glucosid, resin or concentration, which, being accurately dosed and compressed in a small granule or tablet, we may give with a feeling of assurance that our remedy will hit the mark and in due time we may expect results. If preferred, or where quickness of action is desired, the alkaloids may be administered hypodermically. Occasionally we may meet with persons who have been accustomed to the bulky, strong-tasting medicines and who will object to the granules on the grounds that they are too small to be of any service. I have met a few such, but in these days of æsthetic tastes they are exceptional.

To my mind the acme of therapeutical achievement consists in the administration of the smallest amount of the active principle of a single drug that is necessary to produce a certain effect. Anything more than this is useless if not positively hurtful.

To illustrate the dual nature of some of the crude drugs, I will briefly mention a few of our most popular remedies. Take digitalis, used perhaps more than any other drug as a heart stimulant. Sometimes it stimulates but not infrequently it depresses the heart's action. This latter effect has been attributed to its accumulation in the system, but I am inclined to the belief that such is not always the case, as I have often noticed a depressing effect manifested after a few or even one moderate dose. The stimulating action of digitalis is said to be due to the presence of three glucosids, viz., digitalin, digitalein and digitoxin. The fourth, digitorin, has an action identical with the saponin of senega and is a cardiac depressant. Thus you can see, gentlemen, why we get different results from the action of digitalis. Jaborandi, at one time a valuable agent to produce diaphoresis and increase the flow of milk and muciporous glands, has fallen into discredit because of its variable action. Now, why is this so? The drug is all right, but it differs in the proportion of its active principles. If you will turn to your Materia Medica you will find that jaborandi contains as its chief constituent pilocarpin; second, jaborin; third, pilocarpidin; fourth, a volatile oil pilocarpin. The first, pilocarpin, is the active principle that pro-

duces diaphoresis. The plant should contain one-fourth per cent. of this alkaloid. Jaborin, one of its other active principles, has an action similar to atropin, which completely antagonizes that of pilocarpin; for you well know that atropin arrests diaphoresis and produces erythem. How are we to determine which alkaloid predominates in a crude preparation? To cite a case: Some years ago a physician was called to a case of erysipelas. He prescribed fluid extract of jaborandi, which did the work all right, bringing out a copious perspiration with reduction of fever and rapid convalesence. A few days later the same physician was called to another case of erysipelas. He prescribed jaborandi as before, but on returning to his patient the next day he found no remission of temperature, but a complete arrest of the action of skin and kidneys, with exaggeration of all unfavorable symptoms, and in a few hours his patient was dead. In both the above cases his prescription was filled by the same druggist and the jaborandi used was in each instance prepared by the same firm—a firm whose reputation is irreproachable. The matter was referred back to the manufactory. A careful and thorough investigation was instituted, with a view of locating the cause of the discrepancy. On tracing the plant back to its native clime, it was ascertained that a part of it had grown in the sunshine while the other had matured in the shade. The former had developed an excess of the alkaloid pilocarpin, while the latter had developed an excess of jaborin, which was no doubt the cause of the unexpected action.

Thus we see how the influence of light, heat and moisture upon a plant may determine the relative or absolute quantity of a given alkaloid.

Opium, that old-time friend and sheetanchor, though a much misused remedy, yields no less than nineteen different alkaloids. It is perhaps the most complex, uncertain and dangerous drug with which we have to deal when given in its crude form. When we give morphine we know what its effect will be; but with opium, never. I have known a few drops of paregoric to narcotize an infant, producing convulsions and even death; whereas, on the other hand, extremely large doses of laudanum may be taken by

adults who are not addicted to its use without apparent injury. This variable action is due (barring age, idiosyncrasy, etc., of the individual) to the proportion of its various alkaloids.

Cinchona bark, at one time extensively used in its crude form for the cure of malaria and zymotic affections, has given place to the more eligible alkaloid, quinine. It was found that it was only this active principle that cured malaria, hence it was useless to give a lot of tannin acid, volatile oils and other inert matter.

Aconite contains several active principles, the main one that is of any use being aconitin, which in doses of 1-134 grains every fifteen to thirty minutes will soon reduce fever without the depression that so often accompanies the crude drug or the coal-tar derivatives.

I will not trespass further on your time and patience. I have only mentioned a few drugs to illustrate the principles of this thesis; also to impress upon your minds the necessity of a closer study and more intimate acquaintance with drugs that are derived from the vegetable kingdom. By so doing we may find the action of each principle, and by separating it from other agents that antagonize or at least modify it we will be better prepared to fight disease in all of its protean aspects.

The object of vital importance, after we have selected the remedy to be used, is to obtain that which will give the most speedy and certain results. I am confident we will find agents of such precision as will resolve our therapeutics to an exact science or as near to that desired state of perfection as it is possible for us to attain with our present knowledge of medicine.

ASTHENOPIA AND A FEW FACTS THAT OUGHT TO BE GENERALLY KNOWN ABOUT IT.

BY DAVID W. STEVENSON, M.D., OF RICHMOND.

Asthenopia, or eyestrain, is generally to be found in people who have normal vision. Although this fact is not yet well enough known, it is undoubtedly true that the people who have the greatest relief from glasses are those who often see just as well without lenses as with them. In both eyes there are twelve external muscles as well as two internal ciliary muscles. These ciliary muscles probably cause more eyestrain than the external muscles. Ciliary asthenopia is brought about by spasmodic contraction of this peculiar circular muscle whenever vision may be improved, even in the slightest degree. When the vision is poor and the case is one requiring strong glasses, the accommodation will not benefit the vision to a noticeable degree, and therefore neither the mind nor the eye make any attempt to keep up a useless fatigue. Just as the neurasthenic, without any organic disease, is almost worried to complete exhaustion by minor disturbances, so the slightest amount of uncorrected astigmatism or anisometropia may originate the worst form of asthenopia and headache. While the eyesight may be improved by an ill-fitted pair of glasses, the result to the nervous system is bad, and at best only relieves part of the symptoms, giving the patient the false belief that no further improvement could be expected from ocular correction. Such patients may spend their days supported by the pain tablets to be found at all drug stores. Such a vicious cycle often leads to broken health. If eyes are fitted, they ought to be fitted right. It will not do to fit one eye right and leave the other slightly out of balance. The greatest crime of those who attempt to fit without using a mydriatic lies just here. They often give the same glass

for each eye when one eye requires a slightly different correction either in sphere or cylinder. On the other hand, patients with a high degree of hyperopia are sometimes given such weak glasses that while these are not objected to, still the effect, if there be any, could just as easily be obtained by faith cure.

There are three periods in life that require the greatest care from the oculist. These correspond to childhood, puberty and the so-called change of life. During the first period it ought to be generally known to all that as soon as any child shows the least symptom of crosseyes it should be sent to an oculist. This will apply if the child is only one year old. The parents should never be told to wait and see if the child will outgrow it. The result of such neglect is that the child generally becomes blind in one eye and after the few years of non-use the eye can never be used for sight again even if it is partially straightened by an operation. Eyes thus operated on never mate well together. Exercises for the two eyes when the child is young, combined with a careful correction, will generally cure the strabismus and save the sight of both eyes. I have fitted children two years old with satisfaction to the little patients and with a cure of the strabismus. It is needless to say that such work lies entirely within the province of the oculist, for all such cases can only be treated under the influence of a reliable cyclopedic. The same can be said of children during the age of puberty. At birth all children are born longsighted. Shortsightedness is a disease caused by overwork of the eyes at the nearpoint and generally originates at the age of puberty or from eleven to fifteen years of age. At that time the eye wall is soft, and, like the young tree sapling, it receives its bend which decides its future shape. A dentist stated to me a short time ago that people who kept their teeth in good shape up to the age of twenty-five generally kept them for life. In the same way eyes that are kept perfectly healthy up to twenty-five practically never become shortsighted and never have choroidal degeneration or detachment of the retina as a result.

From eleven to fifteen years of age the overworked scholar's eyes are like a soft rubber ball which has been out in the rain —they become soft and stretch. This changes the curves of the

eye, which, added to any astigmatism they may already have, leads to myopia and choroiditis. The longsighted eye in this case never becomes normal, but always passes to shortsightedness through the gateway of astigmatism.

The dentist can make false teeth that will work, and moreover, everybody has had their baby teeth as extra insurance, yet it can truthfully be said that the eyes are not given the care that the teeth receive. Children have such short arms that they often hold their books too close. It may surprise many doctors to be told that it requires just four times the effort of the accommodation to bring the vision from infinity up to five inches as it would to twenty inches. Parents should be advised to see that the children hold their books off ten inches at the very least. People after forty years of age often have an array of nervous symptoms which are sometimes attributed to pure crankiness and sometimes to change of life. A large part of these symptoms are due either to presbyopia or an exhausted condition of the ciliary muscle. It used to be considered easy work to fit reading glasses. This was true as far as the mere ability to see ordinary print was concerned, but there is really no age which requires such careful, painstaking work and as deep a knowledge of optics and neurology as this. There are many cases when the use of mydriatics is as much demanded at this age as at any age. The worst and most incomplete fitting has been done at this period. Of course, there are many other things which can cause nervous symptoms at this age. Glasses will not cure autointoxication, anemia or organic kidney lesions, but improper glasses or no glasses at all have accounted for an enormous amount of misery at this period of life.

People often imagine that they gain something by putting off wearing glasses for a few years longer than usual. They never gain but always lose. Their glasses at sixty years will be just as strong as if they had received benefit at an earlier period, and neurasthenia in its varied forms might have been spared the sufferer. At this age it is often well for the physician to forbid the use of fancy sewing, lace work or music, and limit the reading to large printed books. Fancy sewing in its varied forms is one of the useless abominations that had better be spared from all ages.

In this age of machinery there is no call for fine needlework. Watching the point of a needle as well as the threads which lie at different depths is a great strain on the accommodation.

The fitting of glasses is not easy work. Every eye contains a certain amount of irregular astigmatism, and it is generally supposed that the spasm of a ciliary muscle will never correct irregular astigmatism, and therefore the eye makes no attempt to correct such trouble, yet it is always a difficulty in the way and must be allowed for by the careful use of the retinoscope combined with the faithful use of a reliable cycloplegic. Spherical aberration further adds to the difficulty in nearly every case. Every oculist makes mistakes. These mistakes should not be due to an imperfect knowledge of the whole science of optics in its physical and mathematical relations. Part of these mistakes may be due to the careless or ignorant answers of the patient, or they may come from a lack of judgment or lack of experience. But no matter how they are made, every oculist makes them. The best are none too good. The best one, if he spends his whole life on the study of optics, will be a student all his life and yet have plenty to learn. Dr. Norris, in Philadelphia, used to charge $100 for every case of refraction. Yet with every case he may have felt, at times, that he might have done better. Some oculists charge $25, but give a half day to each patient. To the patient it may be a better investment than an extra suit of clothes ordered.

The writer's experience has been that 60 per cent. of all headaches are cured by carefully fitted lenses, and of the combined occipital and front orbital at least 90 per cent. are cured.

Dr. Gould has recently stated, in the Journal of the A. M. A., that 99 per cent. of migraine can be cured by ocular assistance. Unfortunately, the writer finds that only 30 per cent. of these trying cases can be entirely cured. All American oculists will admit that Dr. Gould is conscientious in this wild statement, but that apparently this brilliant writer has not yet been able to make an exclusive diagnosis of true migraine. It will, however, bring great discredit on American ophthalmology if this claim is permitted to go unchallenged—that 99 per cent. of migraine can be cured by glasses. It is absolutely false. Every case of migraine

ought to be fitted with glasses. Moreover, it would be better to have their eyes fitted and the glasses changed as often as once a year, if required.

Often remarkable symptoms are cured by lenses. Insomnia by night and drowsiness by day are often cured by the same pair of glasses. Marked gastro-intestinal disturbances are sometimes cured. The writer does not pretend to know how such cures come about, unless the trouble is due to a neurosis, which is benefited by improved nutrition due to an absence of continuous eye strain. Of all the senses, sight is the most continuously used and abused. Some of the signs that show it are lacrhymation, specks floating before the eyes, burning and itching of the lids, dizziness, car-sickness, sea-sickness, photophobia, after-images, foreign body sensations, blurred vision, red eyes, nausea, habitics, and a host of others which are as varied in their forms as the human expression.

DISCUSSION.

Dr. J. O. Stillson, of Indianapolis: We are often asked by the laity, and by the profession, too, how does it happen that everybody has to put on spectacles nowadays, and why do they need them more than they used to in the olden days? I answer, in the first place, there are more people, consequently more eyes. In the second place, our forefathers lived out of doors largely. They didn't exercise their accommodation as they do today. The children in our high school come across the street to my office and talk conic sections and logarithms and things I did not study until I was a senior in college. And so the children are forced by the advances made in the intellectual world to use their eyes more, and consequently they give down sooner. A weak eye is an overworked eye. We wouldn't work a horse if he was weak, and yet we do that with the human eye, and that is the reason we have to administer to these people. Dr. Stevenson is right that so many of these cases of asthenopia are deserving of the very highest and best brain that can be bestowed upon them.

The paper is a very excellent one. I heartily agree with him that if eyes are to be corrected at all they ought to be corrected

right, and that to correct an eye right does not simply mean to reach into a basket full of spectacles and pick out a pair and let the patient determine which one he can see best with.

So far as strabismus is concerned, I agree with the doctor mainly. A great many cases of strabismus can be relieved and cured by the proper adjustment of glasses. In strabismus there is strain on the accommodation and strain on the fixation. Unfortunately, we can not always say that blindness in the eye is due to strabismus. We have no doubt cases where strabismus is due to the original defect in the eye itself. The fact is, however, that the squinting eye is always the weak eye: Wilkie Collins expressed it in this way:

"Bean pods rattle most when dry,
We always wink with the weakest eye."

We will find that amblyopia sets in after a while, and then the question is, was the squint due to an original defect in the eye, or did the defect arise from the squint? That does not do away with the necessity for correction of the refraction due to long vision or to short vision. How necessary it is to place the eye in the correct position! It is one of the most important features in physiological optics. It takes more than a mere surgeon to correct a case of squint. Any tyro can sever a tendon, but what are we going to do about the eye ten or twenty years later? Then it takes a master surgeon, a master operator to get that eye back into place and get it to work rightly again.

Dr. A. E. Bulson, of Ft. Wayne: I desire to refer particularly to the habit many physicians have of referring patients to the optician. It is quite true the oculist is charged with jealousy and with being sore because the business is not turned over to him when these patients are referred to opticians, but the opticians make business for the oculists. In advocating the proper, careful examination of the eyes by oculists, in the correction of errors of refraction, we are really preaching that which is not only to the best interests of the patient, but is really against the best interests of the oculist so far as his pocketbook is concerned.

Not many days ago a young patient who had been to me some

weeks previously for the correction of an error of refraction amounting to two diopters and over, with some slight amount of astigmatism, and who had been relieved of the asthenopic symptoms as the result of the glasses prescribed, said to me, "Doctor, I can not see as well with my glasses at a distance as I can without them, and my doctor tells me I ought to see better, and that the glasses are not correct." I hesitated a moment and asked, "What did you consult me for originally?" She said, "Well, I was having headache and my eyes were red and I could not read without great pain and watering and blurring," and several other well-known symptoms of asthenopia. And I said, "Can you read with any comfort now?" She said, "O, yes, I get along beautifully now. I read a whole novel the other night without any headache at all. I sat up until nearly morning." "Yes, but your doctor says the glasses are not right." "But I can not see at a distance." I said to her, "If you are relieved of the symptoms that brought you to me we are certainly on the right track, and I want to tell you positively that your glasses are all right and if at first you can't see quite so well at a distance, in the greatest probability you will see just as well in a few weeks and you will be relieved of the symptoms that brought you to me."

The little muscle of accommodation in the eye which has been working overtime and under strain must let the glasses do the work which it was doing under effort. This case was only one of many which come before the oculist, and only one of many which will go astray as the result of improper advice on the part of the family physician, who recommends a patient to consult an optician who advertises as being Dr. So-and-So, Professor of Optics. Think of it! A reputable physician advising a patient to go to an optician for the correction of an error of refraction.

Dr. F. C. Heath, of Indianapolis: I am glad to commend the conservative position taken by the essayist. The points have been well covered. The little I care to say is in regard to what he said about Dr. Gould, of Philadelphia. We are all ready to recognize his learning, his ability as a writer, etc., but it is strange that a man who has so strongly condemned the extremists as he has

should go to such a ridiculous extreme. There is no one who has ever made such bitter remarks in regard to the muscle clippers as Dr. Gould, and now he has gone to just as great an extreme in saying that 99 per cent. of the cases of migraine are due to eyestrain. But while we condemn this extreme position, and while we recognize the fact that overrating anything brings it into disrepute, let us not lose sight of the fact that eyestrain is a very important question and those physicians who give drugs for headaches due to eyestrain without having a complete examination made are neglecting their duty.

Dr. J. M. Moulder, of Kokomo: My observation has been that about 75 per cent. of the glasses fitted by opticians are nearsighted glasses when in reality the patient ought to be wearing farsighted lenses. For example, a short time ago a patient came to my office who was wearing one diopter myopic lens. This patient, tested under a mydriatic, accepted almost three diopters plus lens. He was fitted almost three degrees out of the way—a positive injury to the patient. The more the patient wore the glasses the worse he would be off, and it is so almost universally that the opticians fit myopic lenses just because the little patients say they see well, and the tendency, as the essayist says, is to produce myopia in the young child and the glasses, of course, would make it still worse.

TREATMENT OF TYPHOID FEVER.

BY C. P. RUNYAN, M.D., OF ELWOOD.

All that I have to say in this paper will deal with the treatment of typhoid fever. As an introduction I wish to say that good nursing may very well take the place of overdosing on the part of the physician. It is not my intention to provide rules to govern your prescribing nor to furnish prescriptions except such as may be required to bring forth an idea or a principle. It is my desire to give general principles which may assist as a guide to the good management of not only typhoid fever but of all kindred types, leaving my hearers free to accept or reject, as the case may be, each principle.

The modes of propagation of typhoid are well understood. The prevalence of this disease is a reflection upon the civilization of the age in which we live. Physicians are not doing all they are able to do in the direction of prevention. We are obligated to those who are brought directly or indirectly in relation with the sick to give them all the protection against infection that the medical science of the time affords.

The usual sources of infection are the intestinal discharges. These should be disinfected the moment they leave the body. This can be done with a two per cent. solution of carbolic acid, a 1 to 5,000 solution of corrosive sublimate, or a 1 to 250 mixture of slacked lime. The dejections should be received in a bedpan containing such a solution well mixed and allowed to stand an hour before being finally disposed of. Close attention must be given to the cleanliness of the patient's person. After each evacuation the parts are to be bathed with a sublimate solution and the solution allowed to dry upon the skin. Infected linen or bedclothing should never be sent to the laundry until thoroughly disinfected.

Nurses must not forget the necessity of attention to their own personal cleanliness. If the germs of typhoid fever are destroyed in every instance within an hour after leaving the body of an infected person an impression upon the prevalence of the disease may be made in one generation.

You must try to check or stop continuous autoinfection and autointoxication. Ordinarily the typhoid germs are swallowed. In some cases they get into the body by other routes. When they are swallowed and are yet mingled with the contents of the bowel some of them at least can be expelled or killed before they do much damage. I do not claim that perfect disinfection of twelve hundred square inches of gastrointestinal mucous membrane, with all its pockets and crypts and folds and creases and other hiding places for germs, is possible. Usually the first time the physician sees his patient the germs have made their attack; they have penetrated into the walls of the intestine; they have been carried by the circulation to remote parts of the body and are beyond the reach of purgatives. As long as they are free in the lumen of the bowel they are open to attack by purgatives and antiseptics.

It is not claimed that the contents of the bowel can be sterilized; it is nevertheless true that by good antiseptic treatment they can be made less offensive to the smell. The intestines furnish favorable conditions for the multiplication of germs other than the typho bacillus. Such germs may be causing decomposition of the bowel contents with the liberation of gases, and toxins contribute to meteorism and mixed intoxications. It may be assumed that the severity of the lesions of Peyer's patches and the solitary glands is due to the number of micro-organisms which has invaded them and the degree of concentration of toxins elaborated in their substance. If this be true, then throw off at least a part of such organisms by processes of purgation and disinfection. If it is true that the severity of the general toxemia is related to the number of micro-organisms which gain access to the circulation, it would follow that by poisoning the culture medium of the germs in the lumen of the bowel and lessening the rapidity of their multiplication and consequently their number, we limit the degree of general infection and intoxication.

A few remarks as to the practical application of intestinal antisepsis. Carbonate of guaiacol as an intestinal antiseptic occupies a high position in the esteem of medical men. It may be given in the dose of two or three grains in capsules every two or three hours. The volatile oils are excellent disinfectants, deodorants and carminatives, and one of the best of them is the oil of turpentine. This may be associated with the oil of eucalyptus one minim, thymol one-quarter of a grain, and menthol one-half to one grain, the mixture to be prepared in the form of an emulsion or put in capsules. The dose is to be repeated every two or three hours. In my opinion salol is of very little value in typhoid fever as an intestinal antiseptic. It may be given freely without making any impression upon the quality of the discharges aside from imparting to them something of its own odor. I have never seen it make any important impression upon the degree of tympanites or upon the general condition of the patient.

If the administration of efficient antiseptics be begun early in the course of typhoid fever, tympany may not occur at all as a prominent feature. Usually, but not in every case, the administration of carbonate of guaiacol with the other volatile oils is followed in two or three days by the subsidence of meteorism, by lessening of the fetor of the discharges, by the improvement in the mental state and by the diminution of the subsultus and jactitation, by abatement of temperature and circulatory disturbance. A physician who has demonstrated these facts is not likely to be driven from his conclusions by critics, however eminent, who have yet to give intestinal antisepsis a fair show.

Keep the bowels free to the extent of three or four dejections in twenty-four hours. In this way it seems possible to keep down the number of micro-organisms in the alimentary canal. I have no hesitation in saying that if the laxative treatment in cases in which constipation exist should be instituted early and steadily maintained the effects would be to lessen the severity of every phase of the disease. But if you are called to a patient for the first time in the second week, or even later than this, when all the damage to the intestinal structures has been done that is likely to be done, the patient having been constipated from the beginning, and when

a concentrated toxemia has already occurred, you are not to begin with a purgative course of treatment. The object is to prevent intestinal lesions. If these lesions already exist, active purgation is contraindicated by danger of causing hemorrhage and perforation. Constantly flush the sewerage apparatus of the body with water, wash the blood, clear it as well as possible of toxins and the products of disintegration. The administration of pure water to the extent of three or four pints daily has the effect of obviating insomnia, quieting delirium and jactitation, and improving conditions of circulation and temperature.

Strength is capacity to act. It depends upon the integrity of structure, and this depends upon the maintenance of equilibrium between disintegration and repairs. Disintegration goes on with great rapidity in every part of the body, and there is no disease in which the same degree of emaciation occurs in the same length of time. Strength is assailed from the very beginning. Disintegration goes on with greater rapidity than repair, so it is not possible to support the strength up to the standard of health. But we must do the best we can in this direction. Support the strength by nutrition. Good milk will meet the requirements. It should be given up to the limit of the digestive apparatus of the patient to digest it. A half pint every three hours night and day would be abundant. If curds appear in digestion it is proof that the method of administration may be improved or that the quantity is excessive. Ordinarily an adult patient will digest three or four pints in twenty-four hours. Digestion may be facilitated by diluting the milk with water. Fresh milk may be given at one time and buttermilk, an excellent article of food, at another. The taste of fresh milk may be modified by adding a little vanilla extract or 16 to 20 per cent. of seltzer water. Strained soups and meat broths may be given. Eggs are not to be overlooked, soft boiled or soft poached, two or three in twenty-four hours. Preparations of beef tea are not to be regarded as standard articles of food in typhoid fever. They may be given now and then as a relish, but are not to be relied upon to maintain strength. When the bacteriologist wishes to propagate the bacilli of typhoid outside the body he selects beef tea as the best known culture medium.

Exhaustion should be obviated. Insomnia, delirium, jactitation and subsultus cause exhaustion. The patient should receive a due amount of sleep. Try to maintain the distinctions of day and night —sleep during the night and wake during the day. If insomnia still persists, give an occasional dose of sodium bromide, fifteen to twenty grains, well diluted and repeated three to six times in twenty-four hours. When the delirium is of the character of mania it is to be met better with a mixture of opium and tartarized antimony. One grain of opium and one-fourth grain of tartar emetic at a dose, repeated every two hours. Moderate looseness of the bowels from the beginning is all right, but when diarrhœa is inaugurated during the third week, after a two weeks' constipation, it is to be regarded as a menace to the patient's life. Make sure that diarrhœa is not due to errors in feeding. If it still persists, an emulsion of three or four minims of deodorized opium will in a majority of cases meet the requirement. Suitable doses of subnitrate of bismuth or the subcarbonate may be added.

Hemorrhage.—Typhoid fever patients do not endure well the loss of blood. A small amount lost often makes a profound impression on the pulse and temperature. Hemorrhage must be treated promptly. The physician must not take time to "read up" on the subject. He must act at once. He must treat it promptly and with vigor and along the lines of arresting peristalsis. Opium must be the central and chief ingredient of any combination of medicines administered. Suitable doses of the acetate of lead, one-half grain of opium and three grains of acetate of lead every two or three hours, according to the urgency of the case. The bowels are to be kept constipated for days, the rectum to be evacuated by soapsuds enema. The ice-bag applied to the right iliac region is of no small importance; it is a good helper. Ergot is employed by some physicians. I believe it does harm by exciting peristalsis and disturbing the stomach. Oil of turpentine ranks next to acetate of lead in the dose of eight to ten minims every two or three hours in the form of an emulsion or well diluted with water. Tincture of chloride of iron I consider an intestinal hemostatic of much value, given in the dose of eight to ten minims diluted with simple

syrup and water. The dose may be repeated every hour or half hour, so that a continuous stream will be passing through the alimentary canal.

The last and perhaps the most important cause of exhaustion is long continued and great elevation of temperature. You must remember that pyrexia is not all there is of typhoid fever, although the temperature range is usually a reliable criterion of the gravity of the disease. Cases terminate fatally now and then in which temperature has at no time been a prominent feature. Nevertheless, it must be admitted that high temperature, however caused, may be the direct cause of death. Temperature, per se, may be a menace to life and without any reference to coexisting infection. The temperature range is taken by some of the best observers as the most reliable guide to a correct estimation of the life prospects of the patient. You must not forget that some fever is salutary and indispensable to the elaboration of the antitoxins or other agencies which serve to make the typhoid infection self-limited.

It has been imagined that by repressing bodily temperature all of the danger of typhoid fever would be dispelled. This is a wrong idea. The more you repress the fever from the normal or spontaneous play the greater is the liability to relapse and to complications. This is unquestionably true in relation to the coal-tar products. It is known that the dangers of the disease are multiplied by the indiscriminate use of antipyretic medicines. Liability to intestinal hemorrhage and to perforation, liability to relapse, all these dangers are increased by the medicinal antipyretic plan of treatment. Conditions may arise now and then in which the patient does not endure high temperature well. Then an occasional dose or two of phenacetin or acetanilid will secure a night's rest; but these agents are not to be regarded as important to the proper treatment of typhoid fever. On the contrary, coal-tar products are to be looked upon as dangerous and to be used cautiously, if at all, and only for brief periods. Small doses produce great effect when given on a falling temperature, and large doses produce little effect when given on a rising temperature. The temperature is less easily disturbed by antipyretic medicines in

the first and second weeks of typhoid fever than it is at later periods. Without a doubt medicines of the antipyretic type, carefully administered, are now and then available for good, but you are always to remember them as two-edged weapons, that are just as liable to cut down as to cut up.

Sponging is one of the most popular and useful methods in dealing with febrile temperature. A sponge bath at a temperature of 60 degrees or 65 degrees F., if attended by gentle rubbing, will make an appreciable impression on the patient's temperature. This is to be repeated as often as the patient's temperature reaches 103 degrees and continued until temperature falls below this point. The rubbing should not be forgotten, as it is an important aid to circulation. Perhaps the most efficient antipyretic treatment is the one known as Brand's method. Hydrotherapy is not contraindicated, when temperature is high, by any complications. It is not contraindicated in pregnancy, nor in parturition, nor in pneumonia.

Brand's method is not without objectionable features. It is distressing to the observer, and of course to the patient. It must be admitted that with all its faults it is the most successful plan of treatment, and has had in the best hospitals the effect of lowering the death rate from typhoid fever. It has not come into extensive use in private practice. There are many difficulties in the way. Good nursing, a bath-tub, a sufficient number of attendants, time and space—these must be available in order to obtain the best results. Many times there is often opposition to the use of the cold bath on the part of the patient and his sympathizing friends. To practice medicine in a hospital is one thing and in private families is another. The application of this method in typhoid fever is not always met favorably. In some cases patients can be commanded or compelled; in other cases the physician may be ordered out of the house. Its influence on the mortality of typhoid fever is undoubtedly favorable. It improves the condition of circulation; it obviates restlessness and delirium; it insures rest and the free elimination of toxins.

When a center or nerve is paralyzed by a toxin or other poison it can not respond to normal stimuli; therefore it is necessary to

sustain heart action. You see evidences of toxic paresis of function in coma, in respiratory failure and increasing cyanosis, in cardiac and vascular asthenia, in urinary retention, in excessive meteorism, and in failure of the reflex centers of the spinal cord, as they are seen in an unchanging dorsal decubitus and a disposition to slip toward the foot of the bed, and by the occurrence of involuntary discharges. Now it is that you will feel called upon to resort to the administration of cerebro-spinal and circulatory stimulants. The most efficient are strychnine, carbonate of ammonia and caffein.

It is under the circumstances described that alcohol is generally recommended and used by many experienced physicians. But alcohol has never been known to improve the aëration of the blood; it has never been known to improve vascular tone; it has never been known to invigorate the action of the heart; it has never been known to exalt reflex excitability; it does not possess the properties that are in demand in the exigencies of typhoid fever.

Infection of the parotid glands may be obviated many times by systematic attention to the cleanliness of the patient's mouth. Weak solutions of borate of sodium; listerine with two parts water. Another preventable complication is bedsores. Bony prominences are to be protected by pads and pillows. Endangered portions of the skin are to be bathed frequently with alcohol and massaged gently in order to maintain capillary circulation. Hypostatic congestion may often be prevented by changing the position of the patient in bed. See that he is not allowed to remain in the same position more than two hours at a time. Syncope is to be guarded against by maintaining the recumbent position. Under no circumstances is a person dangerously ill with typhoid fever to be left alone for a minute.

Extreme caution in the matter of feeding during the stage of convalescence is of great importance. A return to solid food is to be done in the most cautious way. Errors in diet are frequently responsible for gastro-intestinal disturbance and great elevation of temperature. It is possible for errors in diet to be the cause of perforation. Do not try to treat typhoid fever according to rules. There is only one rule, and that is, to obviate the tendency

to death. Hydrotherapy is without doubt the most important single remedy, but to rely upon this to the exclusion of other remedies would be a backward step.

In so far as these principles commend themselves to your judgment, accept them as a general guide to the management of typhoid fever.

DISCUSSION.

Dr. George D. Kahlo, of Indianapolis: Many of the conditions ordinarily regarded as complications in typhoid fever are in fact the result of improper management. Many of these can be entirely obviated. Certain it is that with any management we can employ we will occasionally see such complications as intestinal hemorrhage; you will possibly have hyperpyrexia and may have diarrhœa, and others of the more frequent complications. But many can be entirely obviated with care. The first essential is proper nursing, the second is proper diet and the third is hydrotherapy. Ordinarily very few drugs are required. By proper diet I do not mean simply the routine administration of milk. No doubt milk as a single article of diet has advantages, and yet much depends upon its proper administration. Too often the question whether the patient is digesting the milk is entirely ignored—a question which can be very readily settled by a daily, frequent examination of the fecal discharges. If we have to deal with a case in which the diarrhœa is a prominent symptom, a careful examination of the feces will develop that we have, in considerable portion at least, undigested milk. If, on the other hand, we have to deal with a case in which constipation is the bowel symptom, we may control this very largely by the diet. We might, instead of using an entirely milk diet, use beef juice, beef tea—the juice pressed out, and not the manufactured extract. But these animal foods will go far to overcome constipation.

Now, the essayist suggests that we ought to eliminate the typhoid bacillus early. How, I ask you, are we to know a case of typhoid until it presents the clinical symptoms? And when these exist, how are we to destroy the bacillus as it exists so generally throughout the system by intestinal antiseptics? Very little can be accom-

plished in this way. A popular intestinal antiseptic is acetozone, well diluted in large quantities of water, but the question is, how much result do we get from the large quantity of water used and how much from the specific influence of the acetozone itself? In the beginning I believe we are justified in using oil for a laxative. The same is true of the coal-tar products. It is well to use phenacetin combined with caffein for the initial headache; but after a week or ten days, when we have depression, we must use these agents very guardedly.

The temperature is in many cases due to imperfect metabolism; to improper nourishment. If the case is perfectly nourished we will not have high temperature. Hydrotherapy should be thoroughly employed. I do not mean sponging the body with tepid water occasionally. If sponging will not control the temperature, use the pack. If that does not have the effect, put the patient in the plunge bath at a sufficiently low temperature to reduce the fever. It is not simply a question of the reduction of the temperature, but of elimination by the skin—a very important consideration in the treatment of this disease.

Dr. R. E. Brokaw, of Portland: I desire to speak of the practicability of carrying out the bath treatment in private practice. I do not remember any case where I explained the method to the patient that after one or two baths the objection was not all gone, especially if the patient is having much fever. The benefit of the cold bath comes not simply in reducing the temperature, but in the tonic effect on the nervous system; and there is nothing that will give so much rest and sleep as the systematic use of cold baths. This was very thoroughly impressed upon me very early in my practice. When a student I went to the hospital with Dr. Lohman to see a patient with typhoid. The doctor said, "This young man has been sick so long he can not sleep; he is picking the bedclothes and muttering; he will die in two or three days," and he did. In less than two years I was an interne in the same hospital. There had been a change of management and we were then using cold baths, and we had another young man with typhoid. At the end of ten days he had delirium, was muttering

and getting out of bed and making a terrible noise. He went forty-eight hours without sleep. He had been having the baths before, and the bathing devolved upon three of us residents, but on account of an unusual amount of work that came in just at that time we were unable to use the baths for two or three days and he developed delirium. The superintendent came in and directed a bath. We gave him a bath for fifteen or twenty minutes and put him back to bed. In two and a half hours we gave him another bath, with some hot milk, and he went to sleep. In an hour and a half he woke up and said he felt well. After that the baths were given and there was no delirium. It is entirely unnecessary, ordinarily, that delirium should exist on account of high temperature. The cold bath is a specific.

Dr. L. H. Conley, of Gas City: I would add an idea as to the disinfection of the feces. Pathologists have taught us that bacteria do not stand a temperature of about 60 C. They will stand any degree of cold. Consequently we have an effective agent, and one that I have used in the past three years, in scalding hot water. I use a disinfectant in the vessel, as advised. They have the disinfectant there in large quantity and keep it in a vessel, and as soon as the bowels move I instruct them to use one or two quarts of scalding hot water. Where we have not got sewerage, before the dejections are carried out and deposited where flies can get at them, I insist very strongly upon this hot water.

Now, a little further as to hydrotherapy. Where we have Mrs. Brown on one side of the patient and Mrs. Smith on the other, we can not reduce it to a system. They object to it. They object to using the cold applications. You can get them to use water, however, at a temperature that is grateful to the patient, and the latter, I find, will frequently ask for it cooler and cooler. A hot sponge bath will sometimes reduce fever by rendering the skin more active and eliminate the poison more rapidly than the cold application. I have seen it. If I have a trained nurse I first use hot water, then tepid water, and then cooler water, but always at a temperature grateful to the patient, and I commonly keep the temperature below 103, the temperature at which the cold bath is indicated.

As to internal antiseptics, I use them. I use salol, guaiacol and sulphocarbolate of zinc. I don't know how they act. I can not say just what effect they have on the system, but I get results that correspond to hospital results. I do not pretend to render twenty-five feet of gut antiseptic, but I know I get results just as I get results with quinine in malaria. Then it keeps the people busy, the patients get along, and I am happy. (Applause.)

Dr. H. G. Reed, of Tipton: Three years ago I had some personal experience with typhoid fever. My wife was chief nurse for sometime, and one day when the temperature was 105.5 I asked for a cold bath, but she was afraid to undertake it without the consent of the doctor. I said I would tell her how to give it. I guess she thought I didn't know what I was talking about. So she telephoned to the doctor and he said she should sponge me. So she used water just comfortable to the body and after the anterior portion of the body was sponged I said, "Fan me." There were two or three persons there, and they fanned me until the water evaporated, and so they alternately sponged and fanned until my body was as cold as an icicle. Then I turned over and they sponged and fanned my back and the temperature was reduced about two degrees. An hour after it was down to 102.5 and I was comfortable. After that I didn't want any cold packs. The sponging was good enough for me with the fanning. In a number of instances since that, where the cold packs seemed to be impracticable for want of skilled assistance, I have used the sponging and fanning with equally as good results as with the cold packs.

Dr. A. W. Collins, of Anderson: I like to employ intestinal antiseptics. Of course, we do not kill the germ of typhoid, but we do have them in typhoid, and if we can counteract their influence partially we have certainly accomplished something. If we have typhoid ulcers in the intestines we should treat them as nearly antiseptically as we can. You would treat a wound or an ulcer anywhere else antiseptically and why should you not aim at that in the intestine as nearly as possible? It also corrects in a measure

the fermentation which seems to me to be largely the cause of the tympanites, and with an intestinal antiseptic you have less tympany and less fever. If you use intestinal antiseptics you will not have to use the water so often.

I have not the objection to acetanilid and that class of preparations that some have, but I object to them in large doses. In small doses, given with a stimulant, they sometimes do good. I believe that acetanilid not only assists in reducing the fever but acts also as an antiseptic as it does externally. Strychnia should be given from the beginning in every case, varying the dose according to the indications.

Dr. G. W. Daniels, of Sweetser: I doubt if there ever was a case of typhoid fever needing strychnia. Alcohol is useful as a stimulant. I think strychnia is a detriment. It causes a train of nervous symptoms. Over my way my father is one of the old strychnia men. We treat typhoid separately. His cases get well and mine get well, but the point I want to make is that his cases have more nervous symptoms than mine and I never yet have given a dose of strychnia to a typhoid patient, but prefer quantities of whisky whenever I think anybody else would give strychnia. Though the essayist has raised some objections to it, his objections are overruled if he will use it in a practical way.

Another view: I don't think tincture of chloride of iron is good in hemorrhage in typhoid. Another thing I use is a normal salt solution, and I do not wait until the patient is exhausted; I use it per rectum. I believe you can keep your patient on good buttermilk or sweet milk; then you do not need to take any chances with beef soup, which is almost always made with so much grease in it that it gives rise to symptoms you do not want. A temperature above 102 should be looked after and the patient sponged. The people in my country have had little experience with the cold bath. I think it is a cumbersome procedure. A good nurse can have the patient sponged and the temperature reduced before you can get the bath ready. It is all right theoretically, but practically I don't think it is necessary.

Dr. C. P. Runyan, of Elwood: I think the reason some of us use

whisky and some strychnia or other stimulants is because of the difference in our patients. Whisky will do for one what it will not for another. The same is true of the whole treatment of typhoid. There is no disease which ought to keep the physician awake more at night than typhoid fever, because it needs to be watched closely. Take a case of malaria—you can give him a quarter's worth of quinine, tell him how to take it, and "turn him loose." You can not do that with typhoid because of the different symptoms that arise. The physician must be on the alert. I thank the gentlemen for the discussion of the paper.

Dr. J. J. Kyle, of Indianapolis: I have been one of the advocates of acetozone, but in the irrigation of wounds, especially ulceration of the cornea and chronic otitis, I must confess that my experience in these cases has been very unsatisfactory with it. I recall several cases of corneal ulcer in which we got no results whatever, but other antiseptics might have given no better results. As I said awhile ago, the result of antiseptics depends in part on the constitutional pecularities of the individual. It depends on the amount of the infection and the constitution of the individual.

W. D. Schwartz, of Portland: I believe Dr. Brokaw, who spoke so favorably of immersion baths, has left the room. He made quite a hit in our country with the baths. He put every patient in a bath and they got along well. He made a reputation on typhoid in that way. I quit treating patients that way because I saw two deaths due to the baths at the hospital when I was interne. Since then I have not used the cold bath, but use the cold sponge, and as a stimulant for the heart I use strychnia. I do not believe in using any stimulant until it is required. I think whipping up a heart in the beginning of typhoid or any other self-limited disease is bad practice, and I never use it until it is necessary; then employed, the heart will respond and it will be of some use for some time. I believe in buttermilk. I feed my patients ice cream if they can get it. The doctor said he lost three cases in five years. I have practiced seven years and only lost one. In a case or two that I have seen where a milk diet didn't agree I used liquid pep-

tonoids. You have to watch the bowels and give them the diet that agrees with them best.

Dr. E. D. Moffett, of Indianapolis: I am afraid physicians are too slow to grasp the advantages of acetozone as an intestinal antiseptic. The preparation has surely been able to reduce the percentage of deaths, and that is what we want in the treatment of any disease. We do not want to have 16 per cent. of deaths all the time. We treated typhoid with turpentine a few years ago and with the other different antiseptics. Now, if we are going to use another form that will assist us and reduce the deaths to two or four per cent., hadn't we better use this? It is simple and harmless. I will guarantee we will have results we never had before.

Dr. Whitefield Bowers, of Michigan City: I agree with the last speaker's last remark—that we will have results we never had before in typhoid fever. I have had but three deaths in five years from typhoid, and two of those were on the acetozone treatment.

Dr. C. S. Bond, of Richmond: I desire to call attention to the so-called "systematic treatment of typhoid." I think if we have any faults it is in reducing our practice to a system. When cold baths were introduced we began at once to have a "system" of cold baths. We were at fault in that, and also in any other disease. Each patient is a problem to himself. The young man whose case was quoted, with the high fever, who got the cold bath, no doubt needed a cold bath at that time. But it is a question in my mind how many cold baths that young man needed. When it became a "system" I think that was a departure from the highest services of the doctor. There is no doubt a great many of these high temperatures can be reduced by cold baths and they should have it, and it has been one of the most happy experiences of my practice to control these temperatures by baths.

Again, the first speaker in the discussion spoke of antisepsis by the use of a certain drug. That can be brought about by a great many drugs. It is hardly a question of which one should be used, but the necessity does exist, because some of the most serious and

annoying complications occur even after four or five weeks, when they have the same phenomena for four or five weeks more, and in such cases there is some neglect. These patients should not reinfect themselves and have the same symptoms over again if there is anything in disinfection. But I believe the giving of these drugs as a system is bad. A great many do not need it. In beginning typhoid the damage is done before the patient is seen by the doctor. Peyer's patches are already sloughing. The difficulties are not from the sloughing, but from the general infection.

ETIOLOGY AND DIAGNOSIS OF SCARLET FEVER.*

BY A. L. WILSON, M.D., OF INDIANAPOLIS.

There is, perhaps, no disease of more universal interest to physicians in its immediate and remote effects than that of scarlet fever. Not only the general practitioner, but the specialist as well, in almost every line has more or less to do with the effects of this disease. Like all the other exanthemata, the specific cause of this disease is not definitely known. The belief among investigators is very general however, that it is of microbic origin; but the bacillus of scarlet fever, if there be one, has not been isolated. That the disease is highly infectious there can be no doubt; and while it may be difficult, and at times impossible to trace the source of infection in a given case, yet it is never believed to be of spontaneous origin. Just what effect climate has upon this disease is uncertain, but in this country the epidemics occurring in the fall and winter are more severe than those in spring and summer. It is of interest, also, to note here that Japan is said to enjoy freedom from scarlet fever, and in India the disease does not prevail epidemically among the natives. The poison of scarlet fever is less volatile than that of measles, and also much less likely to be communicated to all the unprotected persons coming in contact with the disease, than in either measles or smallpox. The scarlatina poison is very tenacious, however, and may remain potent in clothing and other substances for a very long time. It may be transmitted not only by those afflicted, but by healthy persons, inanimate objects, or domestic animals as well. The sexes are about equally affected. Age is a very important element in this disease, it being especially a disease of early childhood, although no age is exempt. Very young infants

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are rarely attacked, and it is not common among persons of mature years. The most susceptible age is from 1 to 15 years, with the greatest proportionate number of cases occurring from 1 to 5. Neither race nor color seem to furnish immunity. The rash is not so characteristic in the negro as in the white race; but the angina is fully as bad, if not worse, and the other symptoms are the same.

The period at which the disease is most communicable from the body of a scarlet fever patient is uncertain; but in all probability it is highly infectious from the beginning of the period of invasion until the desquamation is complete and the nasal and pharyngeal discharges have ceased. As yet it is not determined, so far as I know, just how the disease is transmitted from the sick to the healthy, but is it not probable that the discharges from any of the inflamed mucous membranes, the respiratory especially, may convey the poison of scarlet fever? Personally, I believe it is, and that often not sufficient attention is given to these discharges. Even an otorrhœa, it seems to me, may for some time at least be a source of danger. The most frequent source of infection, however, is believed to be from the exfoliated epidermis. These fine branny scales diffuse themselves through the air and permeate clothing and other nearby substances, thus not only rendering the atmosphere in the immediate vicinity of the patient highly infectious, but by contaminating clothing, etc., it may be conveyed for great distances and its potency retained for a very long time. Articles of food may be contaminated in this manner also. As it is not positively known from just what part or parts of the body of a scarlet fever patient the infecting agent is derived in any given case, neither is it possible to know, as yet, definitely, how it gains entrance into the body of a healthy person. But it is generally believed to be taken into the system by absorption from the respiratory or alimentary tracts. And as in the vast majority of cases, the throat symptoms are present very early and constantly, is it not reasonable to conclude that the poison first finds lodgment in the throat, either in the act of respiration or deglutition, and develops from that point, the fever and other general symptoms being secondary? Most authors describe a sur-

gical and also what is called puerperal scarlet fever. When there is a genuine scarlet fever in these cases, it always means that the wounds have been infected by being brought in direct contact with true scarlet fever poison. There is more skepticism about these cases now than formerly; but so long as the post-operative and post-partum, together with traumatic erythemas, continue to be diagnosed as scarlet fever in the absence of other signs, such as angina, glandular swelling, "strawberry tongue," desquamation, etc., confusion as to the true nature of the trouble will be inevitable. Usually, one attack of scarlet fever protects from subsequent ones, but this is not always so, and the same person may experience two or possibly more attacks. Referring again to the possibility of scarlet fever infection being conveyed by food products, I wish to call attention particularly to the danger of milk infection, not only in this disease, but others as well, and to emphasize the importance of rigid inspection of the milk supply by our City Boards of Health.

In 1885, Klein investigated the epidemic of scarlet fever prevailing in London, and held that the source of infection was derived from the milk supply from a dairy farm at Hendon, where the cows were then suffering from a constitutional disease associated with enlargement of the udders, together with the development of vesicles upon them. He believed this disease to have been true bovine scarlet fever. Other investigators of like epidemics in cattle, notably Cruickshank, have failed to sustain Klein in his opinion, and maintain that the disease as found by him is genuine cowpox, and has nothing whatever to do with scarlet fever. Most of the recent authors mention milk as being a source of danger in the spread of this disease. Statistics, however, are generally wanting. In the transactions of the Indiana State Medical Society for 1903, there is an article by Professor Severance Burrage, of Purdue University, entitled, "Some Interesting Typhoid and Scarlet Fever Epidemics," in which he states that "During the latter part of the year 1902 there occurred among the students of Purdue University thirty-five cases of scarlet fever of varying degrees of severity and that all the persons so attacked took their meals at boarding houses or 'clubs' supplied with milk by the same

dairyman. An inspection showed the cows to be healthy, and the only thing which pointed toward the solution of the problem was the fact that during the preceding spring the dairyman's family had scarlet fever, and that the heavy clothing which they then wore had probably been put away without proper disinfection, and being put on again as the cold weather returned, the milk in this way became infected."

In this connection I wish to call attention to the outbreak of scarlet fever which occurred in this city in January and February, 1903, and to present for your consideration the following statistics, taken from the records of the City Board of Health. The city had for some time been comparatively free from scarlet fever. The records show that in December, 1902, there were only eight houses quarantined, with a total of eleven cases. All of these cases were south of Washington street, except three, and they were one each in West Indianapolis, Brightwood and Irvington.

From January 1 to 19, 1903, there were thirteen quarantined, with sixteen cases, of which eight cases were north of Washington street, and located as follows: One case at 319 North Keystone avenue; 2209 North New Jersey street, one case; 1309 Brookside avenue, one case; 2030 North Alabama street, one case; 716 North West street, one case; 1930 Bellefontaine street, three cases. I am informed by the Milk Inspector that there were approximately 650 licensed milk sellers in the city at that time, with about 400 dairy wagons, of which number Mr. F. had two. The first case reported, giving Mr. F. as the dairyman, was on January 20, when six cases were reported, in five different houses, all of which were supplied with milk by Mr. F., except one, and that one was on Minnesota street, in the extreme southern portion of the city. Mr. F.'s five cases were located as follows: 1520 North Capitol avenue, 3328 North Capitol avenue, 2611 North Capitol avenue, two cases, and 1815 North Delaware street.

From this time—January 20 to February 19, inclusive—there were 47 scarlet fever quarantines established in the entire city, with 106 cases reported. Of these Mr. F. had 21 quarantines, with 77 cases, including 37 in the Colored Orphans' Home. Of

the 47 quarantines, there is, for some reason, no record of the milk supply in 14. Of the other 12 dairymen named in the records, each had one quarantine, and they were widely scattered throughout the entire city, while Mr. F.'s were all between Bellefontaine street on the east and Highland Place on the west and north of Pratt street, which practically covered his entire route. And within this territory during this time there were only five other cases reported, no two of which had the same dairyman, and they were far apart. Mr. F. is an intelligent, honorable gentleman, and was unusually cleanly about his dairy work, and I know that this condition greatly worried him. The only thing which in any manner whatever pointed to the source of the contamination was the fact that a young man in the family called upon a young lady and spent the evening with her, in whose house there was a servant woman with her little child, recently brought there from a distance, which, at the time of this social call, had scarlet fever, from which she died. I am informed by Mr. F. that this young man did not work about the cows, but that he did ride in the dairy wagons to and from the city, as he was attending high school, and that he probably wore the same clothing to school as he wore when making his call on the young lady.

The question was raised as to the probability of the contagion being carried by the tickets used, rather than in the milk itself; but at the Colored Orphans' Home, where they were practically under quarantine because of the prevalence of smallpox in the city, and where there had not been an admission to the home for more than three weeks, and where the first child attacked had been in the institution for several months, the milk was delivered by Mr. F. in tin cans, and no tickets were used. I am informed by Dr. S. A. Furniss, who was the physician in charge, and also by the president of the board, that they are entirely at a loss to account for the appearance of the disease. In view of the fact that this dairyman had so many other cases at this same time, does it not seem probable that this Home received infection from the milk itself?

Diagnosis.—Scarlet fever, when it is well marked and fully developed, offers no difficulty as to diagnosis. But as every prac-

titioner of medicine knows, there is no disease in which the severity of the attacks in different epidemics or in different patients, even in the same epidemic, varies so greatly as in scarlet fever. From the most malignant type of the disease, where medical skill seems of no avail, to those so mild that the patient can hardly be said to be sick, we find all grades of severity. The disease is so mild in some cases, and the usual symptoms so poorly marked, that, in the absence of an epidemic or history of recent exposure, it is sometimes impossible to make a positive diagnosis, at least within the first few days. In the well-marked cases, there is usually an abrupt onset, with more or less constitutional depression, headache, intense redness and congestion of the faucial mucous membranes, sore throat, often early and persistent vomiting, sometimes convulsions and a rapid rise of temperature, together with a rapid rise in the pulse rate. This sudden onset, with all the symptoms enumerated above, is very characteristic of scarlet fever. But unfortunately for diagnostic purposes, all these symptoms are rarely present in any given case early in the disease, and, even if they be, it is hazardous to make a positive diagnosis within the first few hours—that is, before the rash appears—and in the absence of an epidemic or history of recent exposure.

A correct diagnosis of a suspected case of scarlet fever is of so much importance that it is sometimes better to wait twenty-four hours or thirty-six hours until the disease has declared itself before expressing a positive opinion. In the meantime, every precaution should be taken to prevent its spread, should it prove to be scarlet fever. It is the mild cases—those poorly marked and devoid of the usual symptoms—which are most difficult to diagnose, and which often go unrecognized. It is a serious mistake to fail to recognize any case of this disease, however mild it may be, not only because of the danger of serious sequelæ in such patients, owing to a lack of proper care and treatment, but especially is it important because of the danger of communicating the disease to others. It is a well-recognized fact that the infecting agent is of the same nature in a mild as in a severe case, and a person afflicted with the disease in a very mild form may convey it

to others in a malignant type. As such patients are often allowed to associate freely with other children, great harm may thus be done.

On the other hand, it is very embarrassing to make a diagnosis of scarlet fever and establish a quarantine, and find in a day or so that there has been only a follicular tonsilitis or an erythema or roseola, without any scarlet fever poisoning whatever. We repeat, therefore, it is sometimes better to refrain from making a positive diagnosis the first time the patient is seen.

The "strawberry tongue" is said to be pathognomonic of scarlet fever, but unfortunately for purposes of diagnosis, it does not show itself early in the disease. Usually the eruption does not appear for twenty-four hours or more after the onset of the disease, and the enlargement of the superficial lymphatic glands does not usually appear until the eruption. The rash generally appears first upon the upper thorax and spreads quickly over the throat, neck, chest, extremities and trunk with but comparatively slight involvement of the face. It is of a diffuse scarlet hue, and upon close inspection is seen to be made up of minute punctate reddened spots separated by areas of pale skin. There is usually a paleness about the nose and mouth in striking contrast to the rest of the body.

It is sometimes very difficult to differentiate early in the attack between an erythema and a scarlet fever eruption; but the fleeting character of the former, with but slight if any fever and constitutional symptoms, together with absence of angina and enlargement of the lymphatic glands of the neck, usually enables one to make a positive diagnosis. There are certain drug eruptions, too, such as belladonna, opium, quinine and antipyrine, which are liable to be mistaken for scarlet fever rash by the inexperienced or careless observer. As there is usually more or less fever associated with conditions for which the drug has been given, this symptom may be misleading. But where any doubt exists, it may be dispelled by discontinuing the drug. There is said to be sometimes a prodromal rash in variola, which resembles scarlet fever, but the slow development of the symptoms in variola, as compared with scarlet fever, together with the character

and location of the rash, difference in pulse rate, which is much more rapid in scarlet fever than in smallpox, and the absence of glandular swelling in the latter disease will aid in the differentiation. Rotheln, or German measles, may be mistaken for scarlet fever, but there is a striking contrast between these two diseases in the mode of onset. In rubella the symptoms develop slowly and are usually mild in comparison with scarlet fever. In rubella the throat symptoms are mild, and the rash is of a very much shorter duration, and appears first upon the face, and may be seen about the mouth, while this is not true in scarlet fever. The constitutional symptoms are much milder and there is an absence of the serious sequelæ in rubella.

In rubiola or measles the slower development of the symptoms, the constant catarrhal conditions, with cough and photophobia, the appearance of the rash first upon the face, the slight sore throat and adenitis, the difference in the temperature at time of complete eruption, the difference in the character of the eruption, etc., will usually suffice to enable one to make a correct differential diagnosis.

Follicular tonsilitis may be mistaken for the angina of a beginning scarlet fever, and should not be considered lightly, lest a serious mistake be made. The differential diagnosis between diphtheria and scarlet fever may in some instances be very difficult, as in diphtheria there is sometimes a transient toxic erythema, which may be confusing. Fortunately the infectious nature of both diseases is so well recognized that isolation would be in either case insisted upon. The invasion of diphtheria is not so abrupt as scarlet fever, and as the specific cause of this disease is now known, bacteriological examination may clear up the diagnosis by revealing the Klebs-Loeffler bacillus. Most authors teach that there may be both a true diphtheria and scarlet fever infection in a patient at the same time, both potent and active. This may be true in some cases; but is it not probable that when the infecting agent in scarlet fever is better known, the diagnosis of the two infections separate and distinct and both active at the same time, will be less frequently made?

Finally, the points to keep especially in mind in making a

diagnosis of scarlet fever are whether or not the patient has had the disease, and then the age; also, the presence or absence of epidemic influence and history of recent exposure, the sudden and rapid onset of the symptoms, the early and persistent vomiting, the throat symptoms, the glandular swelling, the character and location of the eruption—its scarlet redness and punctate appearance—and later the charteristic "strawberry tongue" and the exfoliation, together with certain sequelæ, such as ear complications, adenitis, and particularly nephritis with albuminuria and anasarca, together with numerous other serious symptoms unfortunately so familiar to us all.

DISCUSSION.

Dr. C. S. Bond, of Richmond: I came last week from a meeting of the American Physicians, where we had a fine demonstration of what may prove to be the cause of scarlet fever by Mallory, of Boston. I was very much impressed. You remember the fate of the cancer work done two or three years ago; something of the work that has been done in smallpox may be lasting; but Mallory has certainly demonstrated a body in the cells stellate in character, radiating like so many bacilli from a central zone. And this body appears often in the cells, in one field of the microscope three or four times. The sooner we know about the etiology the sooner we will know about prevention and cure, and before very long you will be able to see this excellent work of Dr. Mallory, of Boston.

Dr. Daniels: In our country it is a very common thing to hear the laity speak of two diseases in conjunction. I refer to diphtheria and scarlet fever. I have never been able to find a case of diphtheria and scarlet fever in conjunction. It is either one or the other. But in our community it is common for people to say a child started in with scarlet fever and now it has diphtheria, and I desire to know if any other doctor has had that experience.

Dr. A. L. Wilson, of Indianapolis: I was especially gratified to hear Dr. Bond's report in regard to the possible discovery of

the cause of scarlet fever. Replying to Dr. Daniels, I took occasion to say that most authorities claim that both scarlet fever and diphtheria may exist at the same time. I may say that when the true cause of scarlet fever is known the diagnosis of both at the same time will probably not be so frequently made. I have never seen a case in which I thought both diseases were present at the same time.

SOME POINTS ON MODERN PRINCIPLES IN TREATING FRACTURES AND DISLOCATIONS.

BY J. B. FATTIQ, M. D., OF ANDERSON.

It is wise now and then to strengthen and increase our knowledge by the light of the improvements that are being made as time progresses, and this is especially applicable to the various divisions of surgery.

We are reminded that until quite recently the general principles of the treatment of fractures and dislocations had undergone but little change for centuries. Controversies certainly arose from time to time, but these were mainly spent upon splints or other minor points and not regarding fundamental principles. Recently, however, it became apparent that the old teaching that absolute immobility in a fractured part is necessary in order to secure perfect union is no longer tenable. Formerly the surgeon's sole aim was to keep the fractured bone rigid, leaving the soft parts to take care of themselves; now his aim is to see that the soft parts are ready to resume their functions as soon as union is complete, taking due precautions in the meantime to prevent much disturbance of the fractured ends. This is a most important fundamental change in the treatment of fractures, and I call especial attention to it before speaking of the treatment of individual fractures, because it applies to fractures and dislocations in general and not to any special form; it is no doubt more essential in some forms than in others, but in all it is necessary if the best results are to be obtained.

The practical results of this change in treatment are very substantial. Stiffness, pain, adhesions and swollen limbs are no longer looked upon as inevitable when the sufferer from a fracture first begins to use the affected limb, and a patient thus afflicted is apt to charge up against his surgical attendant the fact that friends sim-

ilarly injured but treated on more modern lines have escaped these drawbacks. There is no doubt that better results can be obtained in the majority of cases by using the more modern methods, chief among which may be mentioned the use of anesthesia, the X-rays and the free use of massage and passive movements from an early period in the treatment of these cases.

The proper use of the X-rays has greatly simplified diagnosis, and it will be probably only a short time before diagnosis of almost any fracture in the body will be made by their help as a routine matter, when properly done, especially where the patient and machine can be got together conveniently. In all cases in which any doubt arises in the surgeon's mind it is incumbent upon him to use this method if the apparatus is available, and blame may fall upon him if it should show that an error of diagnosis had been made it is to diagnose the existence of a fracture in a joint in the first instance. All who have to deal with fractures know how difficult it is to diagnose the existence of a fracture into a joint in the first place, and next, to say precisely what is the nature of the lesion. It is here that the application of the X-rays in surgery finds one of its most important uses; it localizes and defines the direction and extent of the fracture; it makes clear the displacement, and it may still further aid in the setting of the fracture.

While much may be said in favor of the X-rays in diagnosis and treatment of fracture, it is necessary to say a word of disparagement. It has happened that patients have been inclined to base their intention of bringing suit for malpractice on the ground that the fracture was not set properly because the X-rays shadow shows badly and oftentimes gives the appearance of deformity when for all practical purposes it was perfect. In this way in incompetent hands the X-rays may wreak injustice upon innocent practitioners of surgery. It is to be hoped, however, that the public will soon become properly enlightened upon this matter. Another point of some practical importance is that green-stick fractures in very young children can not be traced by such X-ray photography. The bone fibers are probably so soft that they bend without suffering any solution of continuity.

A second respect in which treatment has improved much in recent years is the more extended use of general anesthesia in the diagnosis and treatment of both fractures and dislocations. It quiets spasm, stops pain, permits full muscular relaxation and thereby facilitates accurate coaptation, while, more important still, it keeps the patient quiet until the splints have been adjusted.

The most important improvement, however, that has been introduced into the treatment of fractures and dislocations in recent years is the use of massage and early passive movements. It used to be taught that movement of any kind delayed the union of a fracture, although the behavior of a fracture of the ribs or of the jaw in the human subject and the majority of fractures in animals is sufficient to disprove this view. I recently had a case of fractured humerus at its middle in a man who also received a serious head injury, which latter bereft him of his reason, and therefore no co-operation from the patient was had. On the contrary, in spite of cerebral sedatives and hypnotics, there was scarcely a whole hour of the seven weeks when the injured arm was not turned and twisted and the fragments rotated upon each other—an unavoidable state of affairs, which could not be controlled by any splint or dressing. Notwithstanding all this motion a large callus was thrown out and firm union followed, with a fairly straight arm.

After perfect coaptation of the fragments is had some form of retentive apparatus should be applied so that it leaves the seat of the fracture either exposed or else readily accessible without disturbing the fractured ends. It should fix the joint above and the one below the break, but not those beyond, such as fingers or toes, as passive motion in them is necessary from the start. Smooth rubbing of the area adjacent to the fracture should be daily practiced. It should be done by grasping as much of the circumference of the limb as possible in the palm, rubbing upwards smoothly, evenly, and as gently as may be required to avoid causing pain. Combined massage and passive joint motion will be demanded from and after the third day, at first cautiously and more decided later on, eventually entrusting the work to intelligent hands of nurse or friends. After the end of the third week, in the average case, the

union will be so far advanced that splints may be entirely dispensed with, or at most a light case may be applied in the neighborhood of the fracture, removable when massage is to be applied. Treated in this way, the patient will be able to use the limb soon after the third week if it be in the upper extremity, whilst if it be in the lower extremity he will be able to walk about firmly and usefully as soon as consolidation has so far advanced as to allow the weight of the body to be supported upon it; this will be after the end of the fifth week.

In dislocations, also, the present day treatment shows considerable advance upon that in use a short time ago. The old plan was to immobilize the joint for a time after reduction in order to allow the torn ligaments to unite and so retain the joint surfaces in proper position. A little reflection will show that this view is not altogether correct, since the real factor in keeping the joint surfaces in apposition is not so much the capsule, which is after all only a weak structure, but the tendons and muscles surrounding the joint. If the joint is kept immobile long enough for the capsule and ligaments to unite firmly enough to prevent recurrence of the dislocation, two serious troubles will ensue. First, there will be considerable adhesions in the joint, not only between the torn ends of the capsule and the articular ends but between the articular surfaces themselves. The other and more serious accident is the wasting of the muscles surrounding the joint entailed by the immobilization. They become feeble and thin from disuse and when the patient attempts to use the limb after the splints are removed the muscles are powerless to ward off the various shocks the joint must receive and the liability to recurrence of the dislocation is greatly increased. If, instead of immobilizing the joint, early passive movement, massage, and even active motion be employed, nothing but good is likely to accrue. In the first place, the muscles will not waste; in the second place, adhesions will not form, while, finally, there is little liability to recurrence of the dislocation, at any rate as long as the patient does not attempt to move the joint in the particular direction in which the dislocation occurred.

After these preliminary considerations of the principles of mod-

ern treatment of fractures and dislocations, a few ideas on the more common kinds of fractures and dislocations may be pertinent. The most frequently occurring fracture, that of the clavicle, although usually satisfactory in its ultimate results, often gives much trouble during the early days after the injury, and the method of treatment in most common use, Sayre's, does not meet these difficulties in the most satisfactory way. There is a growing sentiment in favor of using massage in combination with the old style handkerchief method: two handkerchiefs are each folded around rolls of cotton to about the thickness of a perineal strap and they are looped around each shoulder so that the handkerchief passes over the point of the shoulder and beneath the axilla. A firm pad about the size of the closed fist is fastened in the axilla on the injured side in order to lever out the head of the bone. The two handkerchiefs are then tied or sewn together in the middle line behind the shoulders after firm traction has been made upon them, care being taken to see that the handkerchief on the affected side does not pass over the region of the fracture. This is really a form of figure-of-eight bandage and pulls the shoulders well back in a very efficacious and simple manner. A large elbow sling is next put on and gentle, smooth massage is made over the seat of the fracture from the neck downwards to the point of the shoulder. The massage should last five or ten minutes in the first instance and should be repeated twice daily for the first few days. When the patient is erect no other apparatus is necessary; when he is recumbent it is well to pass another handkerchief transversely around the trunk to fix the affected arm lightly to the side. It will be seen that this method causes very little pain and spasm; the rubbing relieves the spasm almost directly and the forcible pulling back of the shoulders prevents the irritation caused by the fractured ends pressing backwards upon the structures of the neck. In three or four days' time the patient may dispense with the sling at times and should be encouraged to practice underhand movements, the forearm being put back in the sling from time to time. Regular usual movements may be used after a fortnight.

Another of the commonest fractures, Colles's, is also one that gives rise to more anxiety than many others. The trouble may

sometimes arise in setting the fracture, but in the majority of cases the important point is the disability which the patient suffers afterwards from the stiffness about the wrist and the fingers, and it is in this particular fracture that the modern plan of passive movement and massage produces its most brilliant results. The disability of Colles's fracture depends not upon irregularity of the fractured surfaces or upon bad coaptation so much as upon adhesions in and around the wrist-joint (mainly in the tendon-sheaths surrounding the joint) and, in spite of marked deformity, the use of the hand and wrist can be perfectly preserved by the painstaking application of massage and passive movement. In treating this fracture it is safest to set the bone while the patient is anesthetized and reduce any impaction if present. There is little tendency to recurrence of the displacement after reduction has been properly effected, as the fractured surfaces are broad and not easily displaced from each other. As to splints, the straight anterior and posterior boards do well, provided the anterior does not reach lower down than the transverse crease of the palm. Massage over the seat of the fracture applied to the dorsal aspect of the limb should be used from the time the limb is secured on the splints and at the same time active and passive movements of the fingers should be practiced, of course removing the back splints during the manipulation. Before the end of the first week passive movements should be made in the wrist; at first the joint is merely extended as it lies on the splint, while the seat of the fracture is steadied by the other hand, but by the seventh day the limb may be taken off the splint, the fractured region grasped in one hand, and passive wrist movements made with the other. Some time during the third week it is possible to leave off the splint altogether, the arm being carried in a sling and perhaps supported by a good firm leather wristlet. Active movements of the wrist-joint should be encouraged from the end of the first week.

Pott's fracture shares with Colles's fracture the distinction of being a perpetual source of anxiety to the surgeon as to the restoration of the limb after the fracture has consolidated. Like Colles's fracture, it is pre-eminently suited for treatment by massage and

early passive movement, and in it, as in Colles's fracture, the use of a splint may be reduced to a minimum. The first point in the treatment of Pott's fracture is to reduce the outward and backward displacement of the foot, which may be very marked. Manipulation usually suffices to correct the displacement if the knee and thigh be fully flexed during the process; this relaxes the tendo achillis and allows the astragalus to slip into place into the tibiofibular arch. Should there be the least difficulty in reducing the displacement an anesthetic should be administered. Occasionally reduction of the dislocation may be prevented by the interposition of some structure, such as the tibialis posticus tendon, between the two bones, and then nothing will avail but an open operation by which the obstruction may be hooked out of the way. When the astragalus has been replaced it should be kept there by some suitable form of apparatus. This is all that the apparatus need aim at doing, for the fracture of the fibula and the internal malleolus which will probably be present also are of secondary importance. Perhaps the best plan is to put the limb upon an external lateral splint with a footpiece at right angles and to let it lie upon its outer border with the knee flexed. This has the advantage of leaving a large part of the limb exposed so that rubbing and passive movement can be easily performed with a minimum of disarrangement of splints. A simple back splint with a right-angle footpiece is not a useful form of apparatus as the displacement is primarily lateral and not posterior; two lateral splints will do perfectly well. Massage is begun from the first and passive movement from the second day. It is of primary importance in these cases to prevent stiffness in the ankle or pointing of the toes, and hence passive movements of the ankle should be begun within three or four days of the receipt of the injury. If care is taken to prevent lateral displacement of the foot by grasping the ankle firmly in one hand, the other may be inserted beneath the heads of the metacarpal bones and made to raise the front portion of the foot. About fourteen days of this course and the light splint may follow. In four weeks the patient may be able to bear his weight and soon after walk upon the affected foot. This is somewhat of an improvement

upon the old plan of encasing the foot and leg in plaster and leaving it undisturbed for from four to six weeks, followed by lameness and weakness in the parts, not to speak of edema and discoloration as well as pain for a much longer period.

The chief obstacle in any form of dislocation of the shoulder is muscular contraction, which keeps the head of the bone out of place, and the first thing to do, therefore, is to overcome this. The best method of doing so without unnecessary damage to the soft parts or further laceration of the torn capsule is to administer an anesthetic. The spasm is at once controlled and the dislocation will reduce without difficulty, in most cases.

The surgeon will generally find, if he administers an anesthetic soon after the occurrence of the dislocation, that reduction has taken place spontaneously by the time the patient has been fully under its influence. But the important point, however, is the after treatment. It used to be the custom to immobilize the joint for a long time in order to obtain union of the torn capsule. Experience shows that this is quite unnecessary and that union of the capsule will occur in spite of even active movements. The most important danger to be guarded against is the wasting of the muscles surrounding the joint, and this alone increases the liability to recurrence of the dislocation when use of the limb is resumed. Here again comes in the policy of intelligent application of passive movements, massage and active movements, already touched upon. The only movement to be interdicted is that in which the dislocation occurred, abduction of the limb, and the patient should be so instructed.

The important surgical feature in elbow dislocations is their correct recognition. It is common to dislocations to be either entirely overlooked or only partly reduced or perhaps confounded with a fracture. Here the X-rays will help. The after treatment is not so important as in other dislocations, the nature of the articulation being such that there is little liability of a recurrence of the displacement. With the arm in a sling and the use of massage as already intimated, without extreme flexion or extension, good results are secured.

Dislocations of the hip-joint are in general to be considered along the principles mentioned in discussing those relating to the shoulder-joint.

As to dislocations of the knee-joint, oftentimes involving the displacement of the semilunar cartilages, there is so much to be considered as to preclude its proper consideration in this already over-long paper, but suffice it by stating that first a positive knowledge of the exact condition of the injured structures is necessary to a proper method of care and treatment. Then there is the resulting acute synovitis that is almost sure to result from the injury and require separate consideration. After proper reduction comes rest, massage, lotions, pressure if there is effusion, and other details according to existing exigencies.

PRESENT TREATMENT OF FRACTURE OF FOREARM.

BY J. E. KING, M.D., OF RICHMOND.

The treatment of all fractures is continually undergoing radical changes, and especially the fracture of the forearm. The idea which it is my purpose to convey by this paper is that because the treatment herein detailed for any special fracture may be today what seems to me the best that I can find, it is not at all impossible that farther experience or new developments may at any time cause me to modify or even completely change my views as well as my method. We are all too prone to think the means we have found satisfactory are the best, if not the only ones to be used; and yet we must be broad enough to admit that some of us who have just as much or more experience may differ radically in our methods in treating fractures of the forearm.

As to bone union, or rather, nonunion: As to the constitutional conditions which are responsible for nonunion, I think there are none except in compound fracture. I think when there is nonuuion the cause will be found that there was either an improper apposition or want of absolute fixation, or both. In short, coaptation and immobilization are the keys that open the door to good results in all of our practice, and I believe that this can only be done by relaxing the patient, by giving ether and using the plaster paris molded splint. (I will illustrate at the close of the paper.)

The interosseous pad, even in form of pencil or thermometer case, wrapped with rubber adhesive plaster or rubber tubing packed with gauze, has at the end practically been abandoned and is not seriously considered by any of the writers on this subject.

The fractures near the elbow I will not take up in this paper. Those in the shaft in one or both bones and those that are near the wrist joint will be considered. When only one is broken our task

is not a difficult one, except when the radius is broken high enough to allow the proximal fragment to be rotated by the pronator radii teres or when an excessive obliquity or multiple fracture makes the question of apposition difficult or impossible. As the ulna is almost always broken by direct violence and there is seldom any displacement, a very simple fixation dressing of plaster of paris meets every indication. The fragments are placed and held in their proper relation until the plaster dries.

With the radius the added problem of sagging compels us to look more carefully into the question of alignment, and often taxes our mechanical resources to maintain the same by any form of dressing. It may with any form of dressing be impossible at times to prevent the production of a callus which in a measure restricts the function of pronation and supination by its presence with or without attachment to the other bone, but here again we are compelled to admit that bones that are properly placed and held in apposition, unite with an inconsiderable amount of callus, in an incredibly short time. We have seen firm union with almost complete absence of bony swelling in fracture of the lower end of radius after two weeks. When we come to fractures of both bones of the forearm we have a still more difficult problem; indeed, the most troublesome condition met with in fracture of the forearm. There have been all kinds of appliances and dressings to control this fracture of the forearm, and today a single method remains pre-eminent and depends, as is generally the case for its good results upon the fidelity and pains of the individual doctor. Mechanically and theoretically it ought to be satisfactory, and from the patient's standpoint it is at least less irksome than most of the other dressings usually employed. It can be stated in a few words: Extension and counterextension by competent help, with the bones held in proper contact, until a moulded plaster of paris splint is made, applied and firmly set. The only padding required is a layer of canton flannel the width of the anterior and posterior layers of the plaster of paris bandage. The anterior splint should not interfere with the elbow-joint when the forearm is flexed to right angle, and semipronation is the position generally em-

ployed. Where the fracture is above the middle of the forearm, the elbow joint, as well as the wrist joint, must be kept in fixation.

Some surgeons who have unlimited experience say that they never yet have seen a radiograph of a fracture of both bones which showed accurate coaptation under any form of dressing, and it is well known that even with weighted extension, overriding is apt to be obtained. On the other hand, surgeons say they have cases where they get the best results by the simple method mentioned. The question of the green-stick fractures differs only in the fact that one or the other bone, where both bones are broken, must have one fracture completed, the other being moulded into as good position as possible with the completed fracture. However, if the deformity continues to be excessive, completing the fracture of both bones will give a better chance of getting a good result.

Where only one bone is the site of a green-stick fracture, the fracture should always be made complete before any sort of dressing is applied. It has been less than eight months since just such a fracture came to me and I tried to get the parents of the patient to let me complete the fracture, but they would not. The result is that the patient has a deformed arm. Hereafter I will not say anything to the parents, but go ahead and do my work.

With fractures of the lower end of the radius, however, we have a larger field for discussion and a fruitful source of discredit to the craft. One of my best teachers declared that he has never seen a Colles' fracture recover without deformity, and that he regarded disability as a rule and not the exception after this injury.

In my own practice I can positively assert that it is with great infrequency that we see anything but the most satisfactory results by the method of moulded splints which we employ. Let us first note the several conditions that may be obtained. Simple fracture with little or great displacement of the fragments and the wrist-bones, multiple fragments under the same condition, and, finally and not infrequently, diastasis of the radioulnar articulation with any of the above. Where the fracture is through the epiphereal line, as is not unusual in the young, or where the ante-

rior or more frequently the posterior edge of the articular surface is knocked off, the condition is comparatively simple and amenable to almost any form of treatment; but where great force has brought about a considerable disturbance of the relations of the soft parts, as well as the soft parts themselves, together with unusual displacement and impaction of the broken bones, the task of reduction and proper coaptation is by no means simple. Fortunately, this state of affairs is not so usual as the simple fracture of the lower end, with displacement upward and backward, which we are apt to meet often, and which is as unsuccessfully managed many times as the more intricate lesions. The procedure for reduction is easy enough, but at times requires considerable force, and always demands an accurate knowledge of the individual conditions. Traction of hand upward and backward to free the tendons, pressure on the fragment, if necessary, first so as to push it along the bone, and then so as to force it into its proper position, aided by traction on the flexed hand, with at times some rotation at the wrist, has yet failed to give the desired result in my experience. Pressure posteriorly on the distal fragment and anteriorly on the proximal fragment ought to be maintained until the moulded splint is properly applied and thoroughly set. The technique of the moulded plaster is extremely simple. A plaster of paris bandage can be used, or if not available, canton flannel which has been saturated with a plaster of paris cream. They should not be the width of the narrowest part of the limb to be treated. The anterior layer should extend from just below the bend of elbow to the lower end of the metacarpus bone; the posterior to correspond with the same. After being placed, and while still soft, they should be moulded by a cotton roller. The question of the position of the wrist is not unimportant. My own practice is always to have it slightly flexed and slightly adducted, the position the natural and comfortable one, and the less liable to be associated with any recurrence of displacement.

As to the length of time they should remain, we should inspect each day until after the fifth day; then, if everything is all right, let them go until about the tenth day, then take off dressing and

have patient work his wrist. Inspect every day for one week; at the end of three or four weeks remove dressing and leave it off. Don't trust the patient, for he will not take it off so soon. As to movement of fingers, encourage it after the fifth day.

IMPORTANT TRIANGLES OF THE THIGH.

BY H. R. ALLEN, A.B., M.D., OF INDIANAPOLIS.

That fractures of the shaft of the femur do not always yield ideal results even in the hands of most skillful and conservative surgeons is a fact hardly open to argument. If the surgeon's skill is beyond question and the ultimate recovery is a deformity, then neither the theory of treatment nor the design of correcting and maintenance appliances can resent analytical investigation.

In this paper the moral and professional attributes of the surgeon will be highly esteemed, but his fractured theories and unmechanical splinting appliances must line up for just what is due them.

Now, before plunging into broken thighs too deeply, stop and take a casual glance at the femur and its peculiar mechanical arrangement. Almost a straight shaft of seven even units, the uppermost of which is bent over nearly to a right angle, with the other six units remaining in the original axis of the shaft. This offset provided by the neck and head of the femur permits peculiar mechanical advantages to the muscles on the inner aspect of the femur that render them certain lever advantages not elsewhere equaled in the thigh. These muscles, branching off from the femur (or, if you desire, converging from the pelvis on to the femur), present certain triangles of force that can be reduced to their ultimate dynamic principles with no less accuracy and precision than can the triangles of strain in the construction of great steel bridges and other monstrous evidences of mechanical progress characteristic of all avenues in modern times, save, possibly, the mechanical features of modern surgery.

From the center of the spheroid head of the femur emerge two sides of every triangle of the thigh. Consequently, all of these triangles have in common one point from which diverge two legs

of each triangle, one to the center of origin and one to the center of insertion. The third side of each triangle is represented by the line which runs direct from the centers of origin and insertion.

The above description of triangles holds good for all triangles excepting those having a pulley device between origin and insertion, in which case it may be convenient to regard the center of origin advanced to the center of the muscular belly, where it begins to depart as a tangent from the periphery of its pulley device. All of the triangles of the thigh which the writer has presumed to call "important triangles of the thigh" must and do comply with the above requirements. Of this group of triangles there are subclassifications, such as pulley triangles, represented by the psoas or iliacus muscles. Then there is a type of functionally constant triangles represented by the adductor longus muscle. Then there is a distinct type for variable triangles represented by the tensor vaginæ femoris muscle, which muscle presents functional variations according to the relative positions existing between femur and pelvis. For example, the muscle is a simple abductor when the femur is extended, but if the femur be flexed to a right angle with the pelvis then abduction disappears and the muscle assumes a new role and becomes a powerful internal rotator and flexor of the femur.

There are many singular and most interesting mechanical movements in these muscular triangles when muscles act singly or in multiple tension upon a normal femur. But when the shaft of the femur is fractured, then come new groups and subgroups of mechanical forces that must be carefully studied out before one should attempt correction of a broken thigh. There was a time when old-fashioned stomachache used to be treated with paragoric, but nowadays the same old-fashioned pain in the abdomen is due to appendicitis, or intussuception, or what-not, and the responsibilities formerly imposed upon that little camphorated analgesis have been disseminated. Old-fashioned fractures of the femur, however, get old-fashioned consideration excepting the many instances in which these fractures are treated with plaster bandages. The advent of plaster of paris was a tremendous step backwards,

and suggests to all who are interested in mechanical surgery the importance of having within our number a few consulting surgical engineers who, with a stitch in time, can save us from the indignity of trying to uphold false doctrines after they have been tattooed upon our pelts and prevent new and self-evident failures from being imposed upon us in the future. Our text-books give very satisfactory descriptions of the results of muscular contraction following fracture of the femur at or near its middle. The fractured area points forward and outward, just as the good book says, and the reason it points outward and forward, with the usual overriding is due to several interesting reasons not mentioned in the good book. In the first place, the normal femur has but one center of motion; this is the center of the head of the femur. But a fractured femur has two centers of motion in single fracture and multiple centers in multiple fractures. With each fracture come new subclasses of muscular triangles, representing new lines of force and new lines of strain. Since it is true that muscular tissue never pushes, but simply pulls, the result of this traction is evidenced by overriding and by angular displacement and by total contraction and thickening of the thigh. If muscle tissue would relax instead of contract in a spastic manner after fracture there would be no overriding nor angular displacement to contend with; but the rule is for muscles to contract after fracture, and it remains for surgery to find out the best method of coping with and overcoming this contraction. Possibly some light upon this subject may be suggested by this paper, in so far as one method of overcoming spastic-traumatic contraction is here presented.

A singular and regular feature of broken femurs is their tendency to produce deformity right from the beginning and to maintain the deformity to the bitter end. This indicates persistency on the part of muscle tissue to obey the spastic messages it receives from nervous centers. As long as these spastic messages are delivered, just so long will muscle tissue respond. How can these messages be stopped? A variety of answers are ready, some good and some bad. Tenotomy or myotomy may arrest deforming influence temporarily, but spastic contraction need not thereby

be arrested. Neurotomy will instantly and permanently arrest this contraction, but a paralyzed thigh is little if any better than a deformed and active thigh. It is fortunate, however, that a removal of the cause of these spastic messages will terminate the spastic contraction, and the cause is usually nothing more than interrupted or continued trauma due to incomplete reduction. It follows, then, since spastic contraction did not exist previous to fracture and persists after fracture and usually continues until complete reduction or anchylosis is established and maintained, that it is incumbent upon us to devote some thought upon the subject of reduction and maintenance devices. Fracture after fracture will spontaneously dislocate without extraneous assistance. Outside causes favorable to dislocation not only aid dislocation but impede antidislocating measures. These X-ray photographs represent cured cases—some cured in plaster of paris with and some without weight and pulley devices. This is the work of our best surgeons. No surgeon can do better with the ways and means here employed. With these ways and means these surgeons did their duty, but look at the results. The surgeon is all right but the ways and means and cumpulsory results are abominable. There is not a man among you who would say the broken bones were never set nor reduced if you knew who did the work. But what good does it do to set a broken bone if you can't hold it where it belongs?

There is a prevalent theory that a bone must be reduced and hidden in a plaster of paris dressing or otherwise occluded at the earliest possible second. Now, is this theory founded on tradition, fiction or fact? When a patient comes with deforming fracture to our clinics a week or two after his accident, is he told to abandon all hope, or is his fracture treated? Does he get a good or a miserable result? Is his result better or worse than one instantly put up? Most people and many doctors rush to a broken bone as if they were going to a fire, and act, usually, with the same degree of intelligence. The writer is not advocating procrastination in these cases. He is merely pleading in the case where it is better to do nothing than to do wrong, and this is every case involving fractured femur.

Now, concerning the design of correction and maintenance appliances, there is much to be said for and against all that has been universally adopted during the ebb and flow of surgical attainment. The weight and pulley device certainly is capable of exerting traction. Its limitations are determined by two chief factors, the grit of the patient on the one hand and the number of available flatirons or buckets of sand on the other. Of course, the elevation of the foot of the bed is merely a side issue, determined by the relatively weight of flatirons as compared to the weight of the patient and his skill in sticking to the sheet. A patient thus secured to his bed on the fourth floor of a burning building suggests to everybody at least one extremely unusual coincidence that may never occur again, but has recently served a good purpose in the form of a good warning. A patient thus restricted can not, as a rule, reach in his pocket for a knife to cut himself loose, because his pocket is hanging in the closet and a heavy weight is hanging to his sore leg. This obedient gravity servant of surgery has for years made traction in the right direction, but it must be conceded that a patient and a bed thus harnessed jointly presents a difficult proposition to take care of, and the patient must remain in bed, and the bed must remain fastened to the patient.

When plaster of paris dressing chalked its presence upon the register of surgical records it very promptly split itself into three nearly equal parts. Some of its advocates use it as a simple retainer in connection with the weight and pulley traction device. Some use it as both retainer and traction device, and some *just use it.* As a simple retainer it retains within its pure white walls some secrets and some secretions, both of which would serve the patient and the doctor better if not so rigorously retained. As a retainer and a traction device it is a superb failure. It still retains the secretions, but the secret is squeezed out. Angular deformity and bones slipping past each other are no longer a secret, known only to the so-called "snugly-fitting dressings," but are actually squeezed out of the professional ranks into the general information bureau of the public.

It is quite impossible to restrict or constrict the muscular triangles of the thigh without producing bony deformity. Remember that mathematicians in general concede that alteration of one side or one angle of a triangle will alter the entire triangle. If, therefore, one of these muscular triangles has its spastic side bent in by the constricting influence of a plaster dressing, or a strap, or a sandbag, or a bump in the bedding, or from a brace, then the entire force thus applied will be exerted throughout each triangle affected, and the resulting alterations in strain and applied force will be a deformity proportionate to the degree of deforming force applied to any one or more triangles. If a plaster dressing be loosely applied it may as well be left off. If it be snugly applied the internal swelling will make it too tight. If it be tightly applied, then internal swelling and pain will prompt its removal. A plaster dressing must not cause undue pain and suffering, and yet it must maintain the reduction of broken bones. The plaster paradox, therefore, resolves itself into a compromise somewhere between comfort and muscular compression resulting in deformity. This is rather an indefinite and variable quantity to be applied in an exact science, and as a matter of actual fact the results obtained by its use do not surpass nor equal in excellence the results obtained previous to its infliction upon us. The reason it was inflicted upon the profession is that the old-fashioned weight and pulley traction device and splints were unsatisfactory. The reason we now have for a change in treating these cases is due in a measure to the fact that X-ray photographs are showing the patient what the inside of his thigh looks like. The patient shows the photograph to his attorney and the attorney explains to the surgeon in a letter that the surgeon will soon be a defendant in another fractured femur case.

The condition of general confession and eminent dissatisfaction both among ourselves and our patients is sufficient indication for a needed change in some of our so-called mechanical departments of surgery. It is a pleasure and a privilege to present for your consideration new theories and appliances, and these plaster models of actual cases and accurate dissections and a working model show-

ing how the slightest force upon one side of a triangle of the thigh will produce angular deformity or overriding of bones or both overriding and angular deformity, and above all, it is a pleasure to show you this X-ray photograph of a broken femur cured without marked deformity in contrast with those pictures already referred to. The writer does not claim more skill than other surgeons represented here by these photographs. All that is claimed is a new or a different theory and a new or different appliance to which time and good usage will assign a definite value.

If this paper, in spite of its many shortcomings, is capable of advancing this rather gloomy subject nearer the light of modern progress, its writer will feel amply repaid for the many idle moments spent in reflecting upon "Important Triangles of the Thigh."

DISCUSSION.

Dr. J. R. Eastman, of Indianapolis: The most cardinal matter in fractures of the forearm is, of course, to properly reduce the fracture, and that means the administration of an anesthetic. I do not agree with those who say it is not possible to secure good results in cases of Colles' fracture. If they are treated properly one should get good results if an anesthetic is administered and these fractures are immediately reduced and adjusted.

I submit it is a mistake to apply in any case of Colles' fracture a long anterior splint. It should not project farther toward the wrist than the lower extremity of the upper fragment, for the following reasons: The concavity of the radius is on the anterior side. If we put in a long anterior splint the tendency is to hold the lower fragment back in an abnormal position. I admit it is often necessary to place in between the posterior surface of the arm and splint a little wedge, but in the main I submit the long splint should be upon the posterior aspect of the arm, for the reason that the "straight edge" is upon the posterior aspect of the arm.

I desire to express my interest in Dr. Allen's paper. Dr.

Allen wrote that paper with his apron on; he wrote it in his workshop, and noted the results of his work while it was being done. However, I take issue with him as to certain points he has presented here. I do this because I think plaster of paris is not to be waived aside in the treatment of fractures of the thigh; it is too useful. I believe Dr. Allen has taken a somewhat extreme position and the golden truth lies somewhere this side of his position. In the first place Dr. Allen has somewhat overdrawn the facts as to the shape of these triangles. The straight line as to the muscles would not exist; they curve somewhat. The muscles are elastic; they are not strings, and therefore when we apply a plaster of paris cast we do not expect the muscle to act as the string acts in his model. One important thing he has left out in the consideration of his device is the traction weight. Whereas pressure will cause overriding it is not so likely the overriding will exist if there is a heavy traction weight on the leg at the same time. Another thing he has not considered, it seems to me, is the effect of the opposing muscles. We have to do here with a solid muscular cone, so that when the plaster of paris is applied we have circular compression. The plaster should be moulded to fit the thigh, but not to constrict it anywhere, not to make pressure upon any point. Equal pressure all over the thigh is the proper thing. I can not see—and I hope Dr. Allen will tell me—why the use of his screw here (indicating on brace) does not act upon his triangles exactly as the doctor says plaster would. It seems to me if we have to deal with a toggle-joint in one case we have to deal with it in the other.

Dr. H. C. Robinson, of Martinsville: I agree with Dr. Eastman. I am not yet ready to give up plaster of paris. It takes a surgeon to fix a broken limb, whatever kind of apparatus he uses. I should like to state briefly to this body the method I have been in the habit of using to treat fractures of the shaft of the femur. In a fracture the strong muscles which are attached to the great trochanter tend to draw the upper fragments outward. The customary method is to pull on the distal fragment and then apply the dressings. My plan is to carry the distal fragment out, then

put on the plaster of paris dressing, with the patient lying down, adduct the parts, then put on well-fitting plaster of paris bandage, extending from the foot up, and pad against the tuber ischii, making a well-fitting pad around the hip. It is easy to get good results in that way if you put the bandage on right. I might say it is easy to get good results in treating fractures of the femur. Adduct the leg, then extend, put on a well-fitting plaster bandage, make a compress against the tuber ischii and the wing of the ilium. Do away with the pulleys; they are not practicable.

Dr. John H. Oliver, of Indianapolis: I am sorry I did not have the pleasure of hearing the first paper. I wish to take exception as to the efficacy of Buck's extension. I am inclined to think also, that Dr. Allen takes his triangles too seriously. They do exist, and they exist in the normal individual to a greater extent than they do in the abnormal. The characteristic deformity which we have to overcome in a large majority of the cases is the outward angular displacement. A muscle in an irritated condition contracts immediately after the fracture, and the doctor's triangles will be more in evidence than they would be before the accident. But we have to tire this muscle out. If we don't do it with the Buck's extension we have got to do it in some other way. We have to pull these muscles out so they will not present these aggravated triangles. The doctor does it with a screw and adhesive plaster, I understand. Others have done it with the Buck's extension. When the muscle is tired out, either by traction, primarily, with an anesthetic or without, these triangles are not in evidence. The muscle is flaccid, and it is our effort to keep it so. Immobilization and traction are the two keynotes in the treatment of this condition. In order to overcome this tendency to outward angular deformity we must put the lower fragment on the same plane as the upper fragment. It strikes me in Dr. Allen's splint, although he is perfectly capable of bending it, that the result is much more easily obtained with plaster of paris than it is with a metal splint. I am aware that each fracture presents peculiar features of its own, and the wise surgeon is the one who meets conditions as they occur. In fractures high up in the femur

I have found the old-fashioned treatment which puts the lower fragment in the same plane as the upper fragment the best. As the majority of such fractures have this tendency to angular deformity, putting the lower fragment in the same plane with the upper will prevent it.

I appreciate the originality of Dr. Allen's paper, and appreciate his designs very much.

Dr. Garrison: In regard to Dr. King's paper, it seems to me that the old, pistol-shaped splint is not entirely to be thrown out of use, for I assure you if you adjust your fracture and use the old, pistol shaped splint, padded out well and with the compress where the angle is and watch the case carefully, you will not be apt to have the deformity spoken of.

Some of these old splints that Dr. Oliver speaks of are good. Undoubtedly many of us have had good results from the Buck's extension. It may be possible if you do not elevate the foot of the bed, that the results will not be good. Get your bed adjusted and put on your weight, and I think you will not have the deformity spoken of. I know many surgeons have done away with weights, have thrown away the shot-bags, and so on. Every case, however, is a case of its own; but if you adjust each one properly and use the Buck's extension you will get a great deal better results many times than you will with this angular affair shown here (indicating Dr. Allen's apparatus). As Dr. Oliver said, you must get control of the muscles, and when you get control of the muscles and keep the foot in line you will find good results from Buck's extension.

I am pleased with the paper read by Dr. Allen and also with the models he has shown; they are very good. I am also pleased with Dr. King's paper.

Dr. L. G. Bowers, of Richmond: In regard to Dr. King's paper, I think one of the important things he brings out might be emphasized. Many times in children in Colles' fracture we have breaking off of one bone and fracture of the other. I don't think that can be adjusted properly without breaking the other. You will have to do this to have conformity. After you break the

bone, first using an anesthetic, I think it is immaterial what kind of a splint you use so that it retains. The trouble is that the bones get out of apposition.

Dr. Allen's paper is a very good one. I think, however, if he would substitute rubber for those strings on his model he would get more accurately at the condition of the muscles. We all know that if a muscle is active in traction all the time we get the deformity he speaks of. I don't think you get the angular deformity if you get the splints with an outward pressure. I use a posterior and anterior splint and use the Buck's extension.

I had one patient—an old Irish lady of seventy-one—who was very refractory. I don't think I could have done anything with her without the Buck's extension. I put on a Buck's extension and put her in bed. I put on a weight—not a very heavy one—and kept her there. She recovered without any deformity. Sometimes we use too great a weight, and, as it is very painful, the patient can not be blamed for displacing our dressings.

Dr. J. H. Ford, of Indianapolis: I did not hear Dr. Allen's paper or all of the discussion, but the fact remains that in the lower third of the femur you rarely have deformity. The nearer you come to the pelvis the greater the danger of deformity. I really think the rotator of the thigh is more at fault than any muscle we have to deal with. My experience has been that men who run a great deal have these muscles greatly developed. The ilio psoas is the muscle we come in contact with in deformities of the upper part of the thigh. The old idea of putting on a weight—and we have all done it, and I have done it as well as the others—and keeping the leg flat on the bed is a bad idea. The leg should be flexed upon the thigh in order to overcome the pull of the muscles; it should be adducted, in order to overcome the pull of the muscles on the outer side of the thigh.

Another thing we should look to is the position of the foot. Many surgeons, in order to put the bone in direct line, overlook the position of the foot and sometimes allow the bone to rotate outward. This you can overcome and avoid because your bone is entirely movable at this point, and you can put the angle of the

foot and knee in any position you wish. If you do not look to this you may leave a worse deformity than any angularity of the bone. As far as plaster of paris is concerned, there are some advantages in its use and some disadvantages. If you keep the plaster bandages too tight you interfere with the return circulation. This has to be maintained, and if your plaster bandage is too tight you will have a slow-healing process.

Dr. W. D. Schwartz, of Portland: I am very thankful for the opportunity of hearing Dr. Allen's paper. While under the tutorship of Dr. Oliver and the late Dr. Marsee I was taught to use plaster of paris in this kind of a case, but I must say I don't like it at all. The first case of this kind I put in plaster of paris I put on Buck's extension and had everything all right, but a short time after it was put up the man got his friends to take him away in a spring wagon and I did not see him until five months later, and then he had an angular deformity. One of the troubles with this sort of bandage is that the swelling goes out of the limb, and unless you adjust a second plaster bandage there is room for motion. Another thing in Buck's extension, the limb is kept straight in bed. The kind of splint I have been using is somewhat similar to the one shown by Dr. Allen. It lifts the limb away from the body and out to overcome both of the deformities that would be there if not overcome by the splint. Then you can put pressure on any kind of a splint and can see the bone all the time and know whether or not it is straight. With plaster of paris you can not tell whether the bone is straight or not. That is the especial objection I have to plaster of paris in this kind of a case. As the swelling goes down it gives room for the curve which is bound to come unless there is enough extension kept on. In the Hodgkins' splint, which is fastened to the ceiling, you can put on as much pressure as you wish and you can see the limb every day and adjust it so the limb is turned out more if there is any indication of an outward deformity. You have perfect control of it with the Hodgkins' splint. To hold a limb perfectly straight with a splint is very tiresome to the patient, but if the limb is flexed a little at the knee it is more comfortable to him.

Dr. E. H. Griswold, of Peru: You must not condemn something because you have had unfortunate results from its use. When your experience becomes greater I think you will use the plaster of paris cast. In regard to the successful use of a cast, there are many of us who do not have a proper conception of what a proper cast is. In a fracture in the upper third of the femur, as we all know, according to the anatomical rule the upper fragment is pulled inward and upward and the lower fragment must be put in direct apposition to the upper fragment. Therefore, that limb should be put on an inclined plane, the thigh flexed from the body and kept in that position. If it is in the lower third it should be treated in an absolutely opposite way. The leg should, in the latter case, be placed against the thigh. If the fracture is in the lower part of the thigh, almost any kind of a cast will do. The Buck's extension will do it without anything else. The muscles of the thigh are the best means for approximating the ends of the middle third of the femur. The doctor speaks of the shrinking of the limb in the cast. Make the plaster bandage as long as the limb requires, adjust your roll of cotton properly and put it on. It will adapt itself to the circumference of the limb. I think that every fracture should be adjusted as soon as the doctor can get his hands on it.

Dr. King (closing): I have nothing further to add to my paper, except to state that this plaster bandage dressing can be made into a pistol shape if you prefer it.

Dr. Allen (closing): I am not an evangelist; I did not expect all of you to be converted to the use of mechanical contrivances. Submit your two propositions to mechanics; they will tell you the rest. One of the doctors said if we had elastic instead of string on the model here we would have a different proposition. The more elastic the substance you put there the more the deformity will pull up. When you break a bone what do you have—muscular relaxation or muscular contraction? We all want to get the muscles flexed, but there always comes a contraction.

I really appreciate very much the enthusiasm that was shown

in the discussion, but it was so diversified that I can not sum it all up. I thank every gentleman who did discuss it for the interest he has shown in the paper. For my own part, naturally I think I am right and mean to continue the methods I have been using. Of course I don't expect you all to follow my methods, but I do want to thank every one of you for the interest you have shown in my paper.

HERNIA IN THE VERY OLD.

BY DAVID C. PEYTON, M.D., OF JEFFERSONVILLE.

With the possible exception of appendicitis, probably no other subject has recently received so much attention from surgeons as that of hernia; yet its increasing frequency, and the fact that practically all hernias, if the patient is not cut off by some intercurrent trouble, sooner or later become strangulated, serves to impress surgeons with the fact that this is a fertile field for thought and work. Hernia, per se, is not a menace to life, and only indirectly, in so far as it is liable to become irreducible, obstructed, and finally strangulated. Yet it cripples the normal power of an individual and lessens his earning capacity. For the foregoing reasons we are warranted in plainly advising all patients suffering from hernia, with few well-defined limitations, to submit to operation for radical cure. It is not my intention to tax the patience of this association in a lengthy review of the literature on the subject, but only to present some practical points on strangulated hernia as we find it in the very old.

No doubt every surgeon has gathered from his own work, as well as from the experience of others, certain well-defined ideas that he holds as important factors in the success of this particular class of cases. A hernia is said to be strangulated when, in addition to being irreducible and obstructed, there is an interference with the circulation of the blood in the contents of the sac.

We come now to the mechanism or pathology of strangulation, which is not yet satisfactorily explained. Berger summarizes the various theories which have been advanced as follows: First, elasticity of the ring. Second, compression of the efferent by the afferent end of the loop. Third, angulation or sharp curvature of the distal end. Fourth, valvular folding of the mucous membrane. Fifth, torsion of the imprisoned loop. Sixth, interposition of the

mesentery, which, in the efforts of the intestine to free itself is spread out like a fan, with its apex toward the ring. Seventh, fecal impaction.

The cause of strangulation is not fully explained by any of these. Strangulation of a partial enterocele, with a narrow orifice, may be accounted for by elastic compression, but where the orifice is large it obviously has no support. Obstruction may be in a way explained by other theories, but with the possible exception of a volvulus, they do not explain the interference with the circulation. The process of inflammation of the imprisoned loop offers a satisfactory explanation. Of course, obstructive venous congestion is the first step in the inflammatory process. May it not be that this inflammatory process, begun in obstruction, by pressure engorgement, is the result of increased activity and virulence of the bacillus coli communis and several varieties of the staphylococcus and streptococcus, which process, if not arrested, results in gangrene and death? Strangulation takes place more often in middle and advanced life.

The symptoms of strangulation are both local and general. We have the evidences of intestinal obstruction. Pain, inability to reduce the tumor; tension and tenderness on pressure, as well as loss of impulse. We have nausea and vomiting—the vomit at first consisting of contents of the stomach, later bile, and finally it may be fecal in character. The treatment is of course operative only, and the earlier the operation the more satisfactory will be our results. With a very few exceptions, such as the patient being in extremis, where time is of more importance than a radical cure, or sometimes in the very old, where the tissues are in a very low state of vitality, a radical cure should always be attempted or aimed at. In the matter of taxis, I am quite agreed with Dr. Frank O. Smythe, of Memphis, that it would be better for the subjects of hernia if the word "taxis" were left out of the treatment in future text-books. It, unfortunately, only serves as a means of great injury to an already weakened and damaged intestine, and I doubt not many a life that could have been saved by an early operation has been sacrificed by reason of the time lost in its practice. It may be the means of reducing the hernia en masse, without the

strangulation being relieved. In all cases the sac must be opened. I am borne out by statistics, and the experience of surgeons in general, in the statement that the very old bear operation quite well, indeed, and that age should not serve as an excuse for denying to those suffering from strangulated hernia the advantage of an early and radical curative operation. The advantages of an early operation are so manifest that it is unnecessary to mention but a few of them. First of all, an early operation means the escape of gangrene of the incarcerated gut, with all its dangers, finally necessitating a resection. The danger of a general peritonitis is obviated. Unfortunately, in many instances the surgeon is not called until valuable time has been lost by taxis, when it is found we have a necrotic gut to deal with, a resection beyond the line of necrosis, and an anostomosis by Murphy button is necessary. When the sac is opened, if it is found to contain omentum, this should be pulled well down beyond the point of constriction, transfixed, ligated and cut off. If a knuckle of intestine is also found it should be carefully inspected, and if of sufficient vitality should be returned to the cavity. We must bear in mind the danger of a greatly weakened intestine, if returned to the abdomen, being attacked and broken down by the bacillus coli communis, resulting in gangrene, perforation and general peritonitis.

In the very old the minimum degree of general anesthesia is very much desired, so that the injection locally of Schleich's solution along the line of incision has proven of great advantage by reason of its local effect. Dr. Bodine, of New York, operates almost entirely under cocaine as a local anesthetic, and attributes much of his success to this fact. Dr. Wyeth has also been employing it with very satisfactory results. When the heart is weakened, as is frequently the case in the very old, the use of oxygen, alternating with ether, is an excellent precaution. It should be borne in mind, too, that old people do not stand confinement to bed for any length of time, so it is of the greatest importance to get your old patients out of bed and in an invalid chair in not longer than four or five days. Turn them to the sound side in twenty-four hours after operation. Oftentimes the success of your case may be determined by your being able to get your patient out of bed in

a few days. Do not be afraid to give the stomach absolute rest for the first twenty-four hours—your patient will be the better for it.

Another point in detail is the handling of the redundant or relaxed tissue of the abdomen in the very old. To prevent it from folding over and displacing the gauze and resting on the wound is often difficult. This may be accomplished by fixing a strip of adhesive plaster between the median line and the wound, drawing the lax tissue well toward the sound side and fixing the other end of the adhesive strip well over to the sound side.

The subject of this paper was suggested to my mind by reason of a case upon whom I recently operated. The patient was a woman, Mrs. G., aged 84 years, with perfect recovery. Her extreme age caused me to write quite a number of very prominent surgeons, asking for their age limit in successful strangulated hernia cases, and such comments as they wished to offer. It is almost the unanimous opinion that advanced age is not a bar to successful operation for strangulated hernia, if surrounded by proper precautions. Also many of them pointed out the danger of taxis.

The following is a list of the various surgeons heard from and their oldest successful cases: Dr. Joseph Ransohoff, of Cincinnati, patient about 75 years old; Dr. B. Merrill Ricketts, of Cincinnati, patient 76 years old; Dr. P. S. Connor, of Cincinnati, patient 83 years old; Dr. Joseph Rilus Eastman, of Indianapolis, patient 71 years old; Dr. Edwin Walker, of Evansville, Ind., patient 82 years old; Dr. Smythe, of Memphis, Tenn., patient 77 years old; Dr. J. B. Murphy, of Chicago, patient 66 years old. Dr. William J. Mayo, of Rochester, Minn., has operated on five cases over 80 years old for strangulated hernia, but does not say whether successful or otherwise. Drs. Cartledge and Bullit, of Louisville, patient 75 years old; Dr. John Young Brown, of St. Louis, patient 70 years old; Dr. William B. Coley, of New York, patient 80 years old; Dr. J. A. Bodine, of New York, operated on patient 89 years old—under cocaine as local anesthetic. Dr. DeForrest Willard, of Philadelphia, operated on patient 95 years old the patient living for three years after operation. Dr. Ochsner, of Chicago, oldest case 81 years old. Dr. J. Oliver, of Indianapolis,

oldest case 98 years old; Dr. M. F. Porter, of Fort Wayne, oldest case 70 years old; Dr. Arthur D. Bevan, of Chicago, oldest case 70 years old.

I now come to the report of the case in point. Mrs. G., age 84, had suffered for about fifteen years from an irreducible femoral hernia of right side. On March 23d of this year, while walking the floor, the hernia suddenly became strangulated, at 7 o'clock in the evening. An examination disclosed the fact that it was strangulated, and the milder means were resorted to, to see whether or not reduction was possible, but it was soon determined that such efforts were futile, and operation was decided on, and at 2:30 in the morning, seven and a half hours after strangulation, the patient was on the table. Schleich's solution was used locally, and inhalations of ether and oxygen were alternately given. The tumor was found to be quite large, and rather a long incision parallel with and just below Poupart's ligament was made, exposing the sac, when it was found the ring was so tightly constricted as to require nicking at several points in order to release the sac, which was opened and found to contain a large mass of omentum, firmly adherent to the neck of the sac. Posterior to the omentum was found a knuckle of small intestine tightly constricted, which was found to be in good condition, not adherent and was therefore returned to the cavity. The adhesions between omentum and the sac and the sac and surrounding tissues were broken up. The omentum was pulled well down below the point of adhesions, transfixed, ligated, and cut off. The same steps were taken with the sac and the stumps returned to the abdomen. Several plans for closing the ring have been advocated, but the two deserving special mention are the purse-string and the Bassini methods. Personally, I prefer the former, which method was used in this case.

This case made an uninterrupted recovery, and was able to walk to her dining-room at the end of about seventeen days, and this in spite of the fact that during her case she was suffering from a bad Colles' fracture that had not done well and was giving her much pain.

DISCUSSION.

Dr. J. C. Sexton, of Rushville: I do not see why we should not, as the doctor points out, go after these cases at once, operate on them early and not attempt taxis on them unless it can be easily effected. I see no reason why these cases should not do as well as younger ones. However, a hernia in an old person will frequently be strangulated before you think it is, because the pain may not be so severe, or the older person will not give such pronounced expression of it as the younger person will. I see no reason why we should refuse to bring our aid to any person who happens to be advanced in years.

Dr. Hayden, of Evansville: I would not hesitate to operate on a patient 90 years old if he had a strangulated hernia. If I am called in the case of a hernia that seems to be strangulated I absolutely refuse to do any further manipulation to return the gut. I certainly am opposed to using any very great effort to reduce any gut that is out and either strangulated or partly strangulated. Of course, if it is strangulated it is impossible to return it. I believe if you can get pulsation in a portion of gut that is outside you may not have strangulation, but rather than use any force at all to reduce a hernia that is not strangulated I would advise an operation for a perfect cure.

Dr. Oliver: I am glad to hear Dr. Peyton argue against taxis. There is nothing surgical in taxis at all; it is unsurgical and unsafe. When I am called to see a case of strangulated hernia I get ready for an operation, and we give an anesthetic. I always have this sort of understanding with the patient. If, under the anesthetic, the hernia goes back, shall I go on and operate or not? I don't try much taxis; it is dangerous. Sometimes the hernia will go back with very little manipulation. I have seen so many cases where a great deal of damage has been done by taxis that absolutely the very name of taxis gives me the shivers. Not long ago I cut down upon a hernia in which the peritoneal covering of the bowel was split for three inches longitudinally. I can not agree with the doctor that the aged bear operations as well as the young. They do not. While I have operated on patients over

60, and some over 70, yet some of them have died one, two and three days afterwards, seemingly from exhaustion. I never have lost a young adult from strangulated hernia.

Now, as to handling a suspicious bowel, there is a great deal in that. Just to tell exactly when a bowel is dangerous and when it is not, whether to resect a portion of the gut or anchor it, is an important matter. I resect if the patient's condition will warrant it. Sometimes we find a portion of the bowel that does not regain its circulation. The peritoneum may be glistening, but the bowel is black and does not respond. I would not think of returning that kind of gut. In these cases I have on several occasions taken a long piece of iodoform gauze and fastened one end of it with two or three interrupted sutures of 00 catgut to the anterior surface of the mesentery corresponding to the suspicious bowel; the other end is then brought behind and stitched to the posterior surface. The gut surrounded by gauze is then returned to the abdominal cavity and the redundant gauze brought outside. The gauze is easily removed on the third day. One such case progressed favorably until the seventh day, when there was a large discharge of fecal matter following the track of the gauze. The patient recovered without further operation. I do not attempt a radical cure in such cases.

Dr. Jared Spooner, of Peru: I have operated twice on patients over 80 years old, and they both got well. I didn't operate on one patient over 84 years old, and he got well. He stayed in bed twelve days, the gut slipped back into his belly, and he got up and walked off. It is well to remember the exceptions. Frequently men don't die when you say they will die, and they frequently die when you think they won't. As Dr. Oliver has said, the great problem is to tell, when you get out a ring of black gut, what to do with it. The problem is whether it will recover its vitality or not. In doubtful cases it seems to me to be guesswork.

Dr. J. R. Eastman, of Indianapolis: Did Dr. Spooner really have a case of strangulated hernia? It may have been simply an obstructed, irreducible hernia. It requires a great deal of faith to imagine a man 84 years old recovering from a true unoperated

strangulated hernia. There is no age limit. Dr. Webster, of Chicago, says he is doing nearly all cases of abdominal surgery under cocaine. I think all cases of hernia should be operated on regardless of whether they are strangulated or irreducible. A hernia hangs over a man like a Damoclesian sword. I object to —or, rather, I would say I would not use—the purse-string suture in such operations as this, because when the purse-string suture is used reliance is placed on a single strand of thread in which there may be a defect, and if the suture breaks all the work is undone. If the surgeon uses several, the sutures are numerous and discrete, and the focus of infection will remain confined to a smaller area.

Dr. E. H. Griswold, of Peru: Two months ago I operated on a lady 94 years old for a strangulated hernia. The strangulation had existed for 34 hours and taxis had been used to a considerable extent. We operated about 11 o'clock at night, by the light of a single oil lamp. In five days the patient was put on a train and carried forty miles to her home. The last I heard of her she was doing well. I believe, with Dr. Eastman, that when an operation is done for any cause it is well to do it in a surgical manner, and there is no reason why a purse-string or anything of the kind should be used except a proper suture.

Dr. Harry Sharp, of Jeffersonville: I wish to discuss two features of these operations. One form of anesthesia has not been mentioned, and that is the subarachnoid use of cocaine. This anesthesia in my hands has been entirely successful, and having used it some three hundred times I have never found a single objectionable feature to it. It can be administered with positive safety in organic heart troubles, and particularly in herniotomies, where you can call upon your patient at any time when you have trouble in locating the hernial sac, to cough, and this will help in locating the hernial sac. In operating for hernia on the extremely old, where time is an important factor, on account of the patient not having taken the anesthetic well, the purse-string suture can be used in one-fifth the time it takes to close the wound. I think that alone will warrant us in taking the risk of the infection that is liable to follow the imperfect suture material.

Dr. Walker Schell, of Terre Haute: Seven or eight years ago I had a patient of 81 years of age who was suffering from a strangulated femoral hernia. We did the operation by lamplight. The patient recovered and was out of bed and about the house in five days. He lived for six years after the operation.

I think no man should undertake, in dealing with hernia, to make taxis unless he is prepared to immediately proceed with an operation, because a strangulated hernia unrelieved is absolutely, from my point of view, a fatal disease, and unless it can be easily and promptly reduced I think any man who appreciates his duty as a physician would immediately proceed to do the operation. I have this to say with regard to the reduction of the bowel: It will present to a practical surgeon in many instances points of exceeding difficulty. He may apply hot cloths wrung out of a normal salt solution; he may wait all the time that is seemingly justifiable on account of the seriousness of the case, and he will be unable to decide as to whether the bowel is able to recover its vitality or not. It is an important thing, measured by time, and time is an important element in any operation. I may say that where there is a distinct opinion that the bowel may recover itself one possibly should be content with thoroughly relieving the strangulation and leaving the bowel fairly reduced. I would hesitate to do as Dr. Oliver says—push a bowel that had almost lost its vitality within the abdominal cavity. If a bowel is devitalized in the abdominal cavity it will almost certainly bring about peritonitis and the case will be lost.

Dr. Oliver: Dr. Schell surely misunderstood me. I never, under any circumstances, replace a portion of a bowel about which there is any doubt without protecting it, or, better, protecting the peritoneal cavity from it, and never have as yet lost a patient from such cause.

Dr. J. H. Ford, of Indianapolis: The first case of strangulated hernia I ever saw was in a patient 81 years old. She made a good recovery. That was a great many years ago. I knew nothing about catgut or purse-string sutures. I left it an open wound, and she got well of hernia and didn't wear a truss. Some years

ago I found a tumor in the abdomen of a woman patient. The tumor was about the size of a child's head. She was an old lady, and I found she had had a hernial tumor there for years. A great deal of force and taxis had been used. She was then brought to the city and taken to a hospital. I saw her at 4 o'clock in the afternoon. Without using any great amount of force I found an old hernia attached with a new accumulation of gut. There was probably four or five feet of gut in this mass. I pulled down some gut—about six inches of it—and was about ready to stop and perform my resection, but pulled a little harder and found a black portion of necrosed gut. A foot of it was already black. I found two or three segments of that gut that was necrosed with live, vitalized gut between. The circle was sound, so I pulled down the gut until I got sound gut and put in a Murphy's button. The omentum I cut off. The old lady made a very fair recovery from the effect of the chloroform, but after two or three days died from exhaustion. A post-mortem was made, and we found portions of the gut above where I resected that were necrosed. She had had a great deal of taxis and had had hernia reduced. The taxis probably brought on occlusion of the circulation. Manipulation is dangerous under all circumstances, and I would avoid any of it if I could.

Dr. M. F. Porter, of Fort Wayne: Cocaine is a more unsafe anesthetic under any ordinary circumstances, injected under the skin, than is either chloroform or ether. The facts are abundantly proven that that is the most unsafe anesthetic of all of them, including nitrous oxide, ether, chloroform or the A C E mixture, and has caused more deaths than any of them. Why does Dr. Oliver put the bowel half back, and then put some gauze in, or what does he put it clear back for? Why don't he leave it clear outside, and then if it dies, all right. If it does not die put it back.

Dr. Oliver: If the doctor brings the bowel out, unless he has an extremely large opening, there will be an angular bend in the vessels which will cause death every time.

Dr. Walker, of Evansville: I operated on Dr. Lewis, of Carbondale, for hernia. I speak of this to show how soon a patient

can get out of bed after an operation of this kind. He had been in a railroad accident a short time before and had injured his back. I operated on him about 8 o'clock in the morning, and when I saw him at 4 in the afternoon he was sitting on the edge of the bed. The operation was performed on Wednesday, and on Friday he walked about the house and on Saturday went to the operating-room. Sunday he said he would go to see his brother. He returned in two weeks, said he had taken the stitches out himself and had good results. I saw him a year after, and the results were perfect. I believe that where the parts are united properly the patients should be allowed a great deal more locomotion than we usually give them. I have had a great many abdominal sections where the patients in delirium got up, and there were no bad results. I am sure I have had some cases where the patients were between 70 and 80, but I can not recall who they were or what number.

Dr. Hall, of Franklin: I was once called to see a man 84 years old who had hernia. It took quite a little effort, but that hernia was reduced and the man was never troubled after that. As to taxis: Instead of pushing back, draw out, and then by gentle pressure you will find it easier to reduce it. I think it is a mistake never to attempt to reduce a hernia. If a hernia can not be reduced, then I think the patient should be operated on. The patient should be in good surgical condition before being operated on. There are many cases that have been reduced and got along well.

Dr. Waterman, of Indianapolis: There is one other thing to be taken into consideration, and that is the diagnosis of hernia in age. I have seen two cases in which there was femoral hernia discovered after death. In one of these cases there was no external symptoms indicating hernia. In regard to taxis: There is a method in taxis, and I think it is frequently misdirected. In one case, after three fairly competent physicians had tried for three hours to reduce a hernia, I was called in to operate. While I was preparing for my operation I saw the attendants carrying the patient to a neighboring house, and when I got there there was no hernia.

Dr. M. F. Gerrish, of Seymour: I use a little taxis. In one case I gave a good, stiff hypodermic injection of morphine, put the patient in position and reduced the hernia. In another case we decided to operate on the patient, but he dismissed all three of us and gave us to understand he would take care of his own case. He took a big dose of salts and that ended his case—he got well. I believe that while we are preparing for operations we may possibly get reduction of the hernia. I don't mean to say the hernias are cured, but we can get reduction for the time being.

Dr. Peyton (closing): It is scarcely necessary to say it would be impossible to meet all the questions that have been brought up here. I shall only attempt to touch on a few of the points that have been brought out. The question of what is best to be done must be determined in the mind of the operator, according to his best judgment, remembering, of course, the question of the danger of returning a gut to the abdomen that will not have the vitality restored. That, however, is a border-line question; that must be determined by the individual operator when he meets it face to face. We all know the danger that is added to the case by resection, therefore we are warranted in taking considerable risk in that respect. As to the question of the very old bearing operations well, I might say that was meant more comparatively than otherwise. However, I still say that I am borne out in that statement by statistics and by the experience of surgeons all over the country, and the question of age must not bar the patient from the advantages of an operation. The question of closing by purse-string suture was brought up. I think that point was so well covered by what Dr. Sharp has said that I shall not mention it further.

The many cases that have been reported by the gentlemen discussing the paper only serve to add to the force of the thought I have aimed to bring out relative to the advisability of operations in the very old. I am only sorry that I did not know of cases of Dr. Ford's and others, that I might have added to my list of statistics. I wish to thank the gentlemen for so liberal a discussion of this paper.

TORSION OF THE PEDICLE IN OVARIAN CYSTS.

BY MILES F. PORTER, M.D., OF FORT WAYNE.

Terillon estimates that torsion of the pedicle of ovarian cysts occurs in about 6 per cent. of all cases. Küstner places the frequency at 38.8 per cent. These figures represent the extremes given by the authors I have consulted. I have not kept a record of all cases of ovarian tumor operated by myself, but find that I have operated eight cases with twisted pedicle the records of which have been kept in such manner as to be available. I feel warranted in saying, however, that in my own experience torsion of the pedicle in ovarian tumors has not occurred in more than 6 per cent. of the cases I have operated. I am inclined, therefore, to believe that Terillon is much nearer the truth than is Küstner as to the frequency of this accident.

It occurs with equal frequency in right and left-sided tumors. Douglas and others believe that torsion of the pedicle is particularly likely to occur in cystomata coexisting with pregnancy. In the only case of cystomata which I have operated during pregnancy, torsion of the pedicle not only precipitated the emergency, but was the first symptom the patient had of the existence of the tumor. Douglas has had a similar experience, having had two cases of ovarian cystomata coexisting with pregnancy in which torsion of the pedicle made operation necessary. Dermoids, according to some authors, are peculiarly liable to the accident. This is in accord with my experience. Kelly holds that spherical tumors are most prone to rotation, while Doran, Thornton and others hold the opposite view. In all of my cases the tumors were regular in shape. In two of my cases there was a sinistro-spiral twist in left-sided tumors. This experience is directly opposed to that of Küstner, which supports Herman Freund's law of torsion in pedicles, which is that tumors of the right side have a sinistro-

spiral twist and those of the left a dextro-spiral twist. In the majority of my cases there was found three complete twists. Complete detachment has been known to occur but is very rare. It is probable, as Smith says, however, that complete separation of the pedicle, with grafting of the tumor to bowel, omentum, or parietes, explains the origin of those dermoids of the abdomen supposed to have been of other than ovarian origin. Doran, Chalot, Smith and others have recorded cases where the vitality of the tumor has been maintained through adhesions after the pedicle has been twisted off.

In case of bilateral tumors, the smaller is said to be the one more likely to become twisted. I have had one case of bilateral cystomata with torsion. The cysts were dermoids and the twist occurred in the larger one. From the literature I have examined on the subject torsion seems to occur with equal frequency in tumors with long pedicles and in those with short ones. However, it would seem reasonable to suppose that twisting would be much more likely to occur in tumors with long and thin pedicles. None of my cases had short pedicles, but, on the other hand, none had pedicles of unusual length.

Concerning the cause of this accident many theories have been advanced, but no single one is adequate to explain all or even a majority of cases. Fecal impaction, the passage of feces along the sigmoid, the vermicular motion of the bowel, emptying and filling of the bladder, contraction of the platysma muscle on the inner side of the pedicle, muscular exertion and pregnancy seem to be factors in causation of the majority of cases. One of my cases seemed to be due to pregnancy and in two the cause appeared plainly to be contraction of the abdominal muscles. The pathologic changes which result from torsion of the pedicle are fairly constant and depend largely upon the degree of the twist and the rapidity with which it occurs. Perhaps the most constant feature is extravasation of blood into the cyst wall or the cyst cavity or both. This gives to the tumor a characteristic color which is never forgotton when once seen. The color depends upon whether the extravasation occurs within the cyst cavity or in the tissues form-

ing the wall of the cyst. In the former the cyst will be a dark cherry red; in the latter the color will be that of a superficial vein —slate. Both conditions often obtain in the same case. This slate color should not be mistaken for gangrene. This mistake has been made, and through it patients have been subjected to the unnecessary risks and inconveniences attendant upon drainage of abdominal wounds. Extravasation of blood into the peritoneal cavity is quite frequent, varying in amount from a quantity just sufficient to tinge the peritoneal fluid to a pint or more. Enough fluid is not infrequently present in the peritoneal cavity to give rise to the usual signs of this condition. Sometimes the extravasation within the cyst is so great as to cause rupture and severe or fatal hemorrhage. This accident is, however, rare. If we recall the fact that the outer portion of the pedicle, carrying the veins together with the ovarian artery is very thin, while the inner portion, carrying the principal arterial supply, is quite thick, we can readily understand why it is that after torsion occurs the blood is still pumped into the tumor but can get out with difficulty or not at all. In addition, the ovarian artery will remain patent in a twist sufficiently tight to occlude the thin-walled veins.

This hemorrhage into the tumor explains the rapid growth which is so frequently noted in these cases. Atrophy and gangrene of the tumor are rare occurrences. Whether the one or the other obtains depends, of course, upon the degree of the strangulation in the pedicle and the rapidity with which it takes place. A rapid and considerable though not complete strangulation will cause gangrene of the tumor, while a more complete strangulation occurring less suddenly may cause atrophy. In a large proportion of cases the strangulation is sufficient to cause irritation of the surface of the tumor and the formation of adhesions to contiguous structures. Omental adhesions are particularly frequent.

The occurrence of torsion in the pedicle of an ovarian tumor is usually accompanied by symptoms and signs which are sufficiently characteristic to permit of a diagnosis in the majority of cases. They are pain, shock, tenderness, rigidity of abdominal muscles, rapid growth of tumor, vomiting, dysuria, pallor, rapid pulse and

constipation. The pain is usually severe and in the majority of cases referred to the site of the pedicle. It may be paroxysmal or constant. When paroxysmal it indicates further twisting of the pedicle. Coincident with the pain, vomiting, symptoms of shock, tenderness and rigidity come on. Vomiting is not a constant but is a common symptom. It usually occurs early and is then a symptom of shock, but may come on later as a symptom of peritonitis and paresis of the bowel. The symptoms of shock are in proportion usually to the size of the tumor, the degree of the twist, and the rapidity with which it occurs. Other things being equal, the larger the tumor, the tighter the twist and the greater rapidity with which it occurs, the greater will be the amount of blood extravasated. This explains why we have more pronounced symptoms of shock in the larger tumors the pedicles of which have been tightly and quickly twisted. By a tight twist is here meant, of course, one which is tight enough to shut the veins and leave the arteries open. Tenderness and rigidity are symptoms of the peritoneal irritation and correspond in location with the tumor. Rapid increase in size of the tumor is quite constant and is due to the extravasation of blood into the growth. In a great many cases the patient is not aware that she is the possessor of a tumor until torsion has occurred. This was true of two of my cases. Dysuria is not sufficiently frequent to be at all significant. It may be due to reflex irritation or to pressure upon the bladder. Symptoms of ileus occur so frequently and are sometimes so pronounced as to lead to a diagnosis of obstruction of the bowels. This was true in one of my cases. This mistake is more likely to occur in cases where there has been no knowledge of the existence of a tumor prior to the accident.

The pallor and rapid pulse, as above indicated, may be manifest at the onset of the trouble, when they are usually symptoms of shock; coming on later they are indications of hemorrhage. Later on the symptoms of torsion are likely to be more or less completely displaced by symptoms of infection of the peritoneum. Torsion of the ovarian pedicle is more likely to be confounded with ruptured ectopic pregnancy than with any other condition. Espe-

cially likely is this mistake to occur in cases in which torsion takes place during pregnancy. In torsion the symptoms of hemorrhage are usually less marked than in ruptured tubal pregnancy, the physical signs of pregnancy are absent, and the tumor presents the physical characteristics of an ovarian cyst. Rupture of a pregnant tube usually takes place before the tenth week, and therefore before any appreciable abdominal enlargement, whereas even in those cases of torsion wherein there has been no previous knowledge of a tumor the latter is found to be too large for a gestation sack of such duration. I have already spoken of the similarity of the symptoms in some cases to those of obstruction of the bowels. It would perhaps be nearer the truth to say that obstruction of the bowels sometimes results from torsion of the pedicle of ovarian tumors.

One can readily understand how the bowel might become involved in the twist in such a way as to produce mechanical obstruction, but I have never known it to occur. On the other hand, I have seen the symptoms of ileus well marked and the obstruction none the less real though dynamic in character.

To mistake ruptured tubal pregnancy or obstruction of the bowels for torsion of an ovarian pedicle would not be a serious matter, inasmuch as the treatment in all is surgical. I have myself diagnosticated a case of torsion of the pedicle of an ovarian tumor as appendicitis. A report of this case will be detailed later in this paper. Such a mistake is not likely save in exceptional cases, and in any case is not serious to the patient though not comforting to the surgeon. The treatment of this accident is of course surgical. The only question is as to the best time to operate. Perhaps most operators agree with Bantock, who advised waiting in very acute cases until reaction from the shock takes place. I have never seen a case in which I thought waiting was necessary, and I doubt very much the wisdom of the advice. All of my cases have recovered, and although in none were the symptoms of shock extreme, yet in two they were well marked. You are perhaps aware of the fact that I regard shock as it occurs in the vast majority of all surgical cases as an indication for immediate operation rather than

a counter indication. If the patient with a twisted pedicle is really suffering from shock, what better can you do for her than give a hypodermic of morphine and atropine and follow this with ether anesthesia, remove the tumor which is the cause of the shock, and if necessary fill the peritoneal cavity with warm saline solution? If the symptoms are the result largely or entirely of hemorrhage, then to await reaction is to court a fatality.

Before closing I would like again to caution against hastily concluding, because of the color of the tumor, that it is gangrenous. Such conclusion would lead one to drain the abdomen, and drainage here should be looked upon as a necessary evil.

The following cases are deemed worthy of record here, the first because it is quite typical and the second because of the age of the patient and the mistake in diagnosis which was made:

Case I. Miss L. S., aet. 29, an inmate of the I. S. F. M. Y., of the higher grade. She gave a history of having an attack similiar to the one which she was having when I saw her, on a former occasion. She was taken suddenly with severe pain in the abdomen, for which she was taken to a hospital. The pain was so severe as to require opiates for its relief. The tenderness was also extreme. I saw her on the sixth day of the trouble, when I learned the foregoing, also that while there was a tumor present during the former attack that it disappeared with the subsidence of the symptoms, to appear again with the present one. Examination revealed a tender, rigid abdomen with a tumor only slightly movable, about the size of a small foetal head, the center of which corresponded with the middle of a line extending from the middle of Poupart's to the umbilicus. It was obscurely fluctuating in its lower aspect, but solid above this. A smaller tumor was found in the right pelvis. A diagnosis of double ovarian cystomata with torsion of the pedicle of the left ovary was made and celiotomy advised. After the patient was etherized the lack of mobility of the tumor was found to be apparent only and due to the muscular rigidity. On opening the belly a tumor of the characteristic color described was found, with a sinistrospiral twist of the pedicle, springing from the left ovary. There was considerable blood-

stained serum in the abdomen. The left tumor was generally but slightly adherent. After removal of this tumor a smaller one of the right ovary was also removed. The abdomen was closed in the usual way with burried catgut and adhesive plaster. Both tumors proved to be dermoid.

Case II. B., aet. 10. Was taken rather suddenly with pain, tenderness and rigidity of the abdomen in the appendix region, with development of a tumor after a few hours. The tenderness, rigidity and tumor were located in the appendix region, though the bulk of the tumor lay below McBurney's point. She gave a history of a previous similar attack, with the notable exception that it subsided rather suddenly and immediately on the subsidence of the pain the tenderness also subsided, together with the rigidity. There was no tumor with the first attack. I advised an operation, saying that while some of the symptoms were unusual, especially the sudden disappearance of the symptoms in the first attack, I yet believed the case to be one of appendicitis. On reaching the peritoneum through an incision in the right iliac region the typical slate color was remarked. The incision was completed and a cyst the size of a duck egg, involving the right ovary with a thrice-twisted pedicle, was delivered. This is the youngest patient upon whom I ever operated for ovarian cyst.

DISCUSSION.

Dr. E. Walker, of Evansville: The paper so fully covers the subject that I do not intend to discuss the paper itself, but merely to express the pleasure I have felt in listening to it. It was admirably prepared.

Dr. L. H. Dunning, Indianapolis: Dr. Porter in his characteristic way, has so fully covered the subject that there is very little to discuss. He has presented it in its entirety. There are some points of interest, however, that might be emphasized. My experience has been somewhat different from his with twist of the large pedicle. I have noted where we have twist of the large pedicle, even if it is only a half rotation of the tumor, serious results did not follow. I would say that if we have symptoms that would

indicate to us a serious condition of the patient, without great increase in the size of the tumor, I should say we have a torsion with a wide pedicle. Regarding the frequency of this, I am inclined to think the frequency is greater than indicated by the figures quoted. I have met cases with a slight torsion where the tumor turned half way over or turned once or once and a half around. Usually, where there is a long pedicle, as stated by the doctor, torsion occurs. I agree with him about the shock. Where we have an ovarian tumor and the patient has been conscious of it for some time, and suddenly we have an increase in the size of it, with a sharp pain in the side and a rise in the temperature, I think we can almost positively say we should prepare at once to remove the mass.

Dr. Allen Pierson, of Spencer: The general practictioner does not often get a chance to remove an ovarian cyst, but sometimes it has to be done as a dernier resort. I saw complete strangulation exist in one case. The symptoms had continued for two or three days, and gangrene of the cyst had already begun. The patient did not recover. She was probably in a dying condition when the operation was resorted to. I speak of this only because there was complete strangulation.

Dr. O. G. Pfaff, of Indianapolis: I should like to speak of one case that was out of the ordinary. The cases reported and generally referred to are the smaller tumors. This one was as large as the natural head, or a little larger. The symptoms which led up to the calling for the services of a surgeon were those of rather sudden pain, increasing from day to day for about a week. The operation revealed a tumor with the pedicle completely twisted. It was a tumor of the right ovary. A large portion of the surface was almost covered by omentum. The portion not so covered was quite black and gangrenous. The portion covered by the omentum showed that nutrition had been kept up on that side.

Dr. H. O. Pantzer, of Indianapolis: What has been said in commendation of the doctor's paper I wish to indorse. I feel it is one that will serve well to emphasize the occurrence of such

accidents to tumors. I agree with Dr. Dunning that the frequency of twisting of the pedicle is not as great as given by the figures stated. About a year ago, and within the preceding consecutive eight months, I had eight cases of ovarian tumors that came to me after the twisting of this pedicle had occurred. When at any time we have the symptoms as narrated in the paper we have reason to think of this possible accident. One thing I found helpful in making diagnoses of the cases mentioned was the symptom observed by the patient previous to the twist, that she found there was something loose within her that "flopped," as she expressed it, from side to side when she turned in bed. I had one case of a young high school girl. The parents reported the case to the doctor and he diagnosed the trouble as grip. The doctor did not see the girl for two or three weeks after that, and then he found a large tumor. When I saw her first, six or seven months after the primary attack, she had the waxy color of degeneration. The abdomen was large beyond that of pregnancy at full time. The diagnosis of twisting of the pedicle was made. I found the entire abdominal cavity taken up by this tumor, which had become gangrenous, and around which nature had thrown a complete wall. When I had evacuated the fluid I put in tubes in all directions and did nothing to break down the wall; in time the bowels came down. As a sequella this patient died within twelve or fourteen months afterwards.

DIAGNOSIS OF SUPRA AND SUBDIAPHRAGMATIC SUPPURATION.

BY JOSEPH RILUS EASTMAN, M.D., INDIANAPOLIS.

It is the intent of the following paper to enumerate and emphasize certain diagnostic facts which are of value in determining the presence of abscess immediately above or below the diaphragm, and the location, source and general characteristics of abscesses in these areas.

In pleural empyema the well-known physical signs of pleurisy with effusion are usually present. These are increase in semicircumference, with obliteration of the intercostal spaces; decreased respiratory movement; loss of vocal fremitus and resonance; dullness or dead flatness on percussion; loss of elasticity of the chest wall; diminished respiratory murmur, and displacement of organs. Change of the upper level of dullness may be effected by moving the patient about. Increased lung resonance may be noted above the effusion—Skoda's resonance. In addition to these signs of uninfected pleurisy with effusion, there are added, in pleural empyema, hyperemia and edema of the chest wall and Bacelli's sign. (The fremitus produced by whispering is not imparted to the hand placed over the purulent accumulation, as is the case in serous effusion.) In loculated empyema with discrete walled-off purulent collections, the physical signs, though present over small areas, are confusing.

Localized inflammatory signs upon the chest wall indicate a beginning attempt at spontaneous evacuation. Musser locates the points of most frequent spontaneous rupture at the fifth interspace in front or below the angle of the scapula behind. It is well known that in empyema the temperature is higher than in pleurisy with effusion, and is intermittent or remittent in character. Chills usually mark the beginning of each paroxysm of fever, and drench-

ing sweats, followed by leaking cold skin, accompany the daily decline of temperature. The pulse is rapid and weakened, finally becoming dicrotic. In the urine indican is present in excess, and albumosuria is usually present, though this, it should be noted, is not at all diagnostic. Respiration is rapid and labored, and localized pain and tenderness may be pronounced. If the pus accumulation follow the so-called diaphragmatic pleurisy, the pain, as has been stated by Guenau de Mussy, extends along the tenth rib, reaching the xiphoid cartilage, becoming intense at the epigastrium, and the continuous irritation of the diaphragm causes nausea, vomiting and hiccough. The dyspnea may be bird-like (the so-called orthopnea).

In chronic inflammatory thickening of the pleura many of the signs of empyema may be present, but without enlargement of the chest. In hydrothorax due to organic heart disease or nephritis the symptoms are not inflammatory, and the primary lesion is readily detected.

In homothorax a precedent history of trauma or of aneurism can be elicited. In the rare condition of pulsating empyema there may be indicision in diagnosis for the reason that the possibility of aortic aneurism may enter the consideration, but the greater area of dullness in empyema and the absence of arterial murmurs should serve to distinguish this condition from aneurism, in which the bruit is usually present, and the tumor, moreover, bears a definite relation to the central longitudinal axis of the chest.

A walled-off supradiaphragmatic empyema may be at times difficult to distinguish from liver abscess or other subdiaphragmatic purulent conditions. In the subdiaphragmatic and liver abscess, notwithstanding the diaphragm may be pushed up and many of the respiratory phenomena, physical signs and general symptoms may simulate those of empyema, the intercostal spaces, particularly those above the normal upper liver border, will not bulge so distinctly as in empyema, nor will the area of dullness extend so high. This has been true in the limited number of cases of liver and subphrenic abscess which the writer has observed. It is probably owing to the interposition of both layers of the pleura

and the diaphragm in subdiaphragmatic abscess, and the added layer of liver capsule and parenchyma in hepatic abscess. The introduction of the aspirating needle, while it may clear up a doubt as to the existence of pus, may not lead to a decision as to whether the location of the pus be supra or subdiaphragmatic. Owing to the upward displacement of the liver and the thinning of the diaphragm, the needle, in subphrenic abscess, may seem to enter the cavity of the pleura.

In empyema due to perforation of the diaphragm and pleura by a liver abscess, the source of the pus, unless the symptoms of liver abscess have been distinct in the beginning, may not be ascertainable until the pus is examined.

Purulent diseases of the chest wall and abdominal coverings should be distinguishable from empyema by the absence of lung symptoms.

Two forms of liver abscess are usually described—one in which multiplé abscesses are found throughout the liver structure, and one in which only one or two large foci of suppuration are found. The first form is pyemic or embolic, and due to secondary deposition of bacteria or septic tissue fragments from inflammatory areas somewhere in the portal area, about the rectum, vermiform appendix, or anywhere along the gastrointestinal tract. It may also follow suppurative cholangitis. The single abscess, or so-called tropical abscess, it is stated, is almost invariably due to the presence of the ameba coli. In addition to these two forms of liver abscess, there have been noted purely traumatic abscess and rarely tubercular abscess. The writer has a personal record of two cases of liver abscess with large single foci in which staphylococci and bacilli coli were present, but the ameba coli, notwithstanding it is easily found owing to its large size, could not be demonstrated. One of these cases was operated, and the other, in which operation was refused, was examined postmortem. There is, therefore, no doubt as to the presence in these cases of liver abscess with large single focus, but due to ordinary pyogenic infection.

The general symptoms of so-called tropical or amebic abscess are practically those of empyema, chills, hectic fever and sweating

being conspicuous. Pain is usually located in the liver. It may be reflected to the right scapular or right shoulder region. It may be paroxysmal or persistent. On physical examination the liver is found to be enlarged, either uniformly or irregularly. If the enlargement be irregular, the prominent mass may extend toward the abdominal wall, toward the axilla, or toward the back. Often the enlargement is upward, displacing the diaphragm, but sometimes extending downward, so that the anterior liver border may easily be palpated below the costal arch. Rarely there is no tumor.

In abscess of the left lobe of the liver the protrusion is usually most prominent between the xiphoid cartilage and the umbilicus. Musser describes an abscess of the left lobe producing eversion of the ribs on each side, rendering the entire epigastrium prominent. Late in the condition of liver abscess, the cardinal symptoms of inflammation, with fluctuation and edema, present themselves over the involved area. If secondary pleural effusion occur, or hepatopulmonary fistula or hepatopleural fistula develop, the symptoms will be mixed with those of supradiaphragmatic effusion or empyema.

In liver abscess the patient will complain of the dragging weight of the liver, especially when lying on the left side. In the cases observed by the writer, lying upon the left side was always productive of acute pain, probably owing to the heavy liver drawing upon the inflammed suspensory ligaments and infiltrated and sensitive diaphragm. This symptom will be present in any inflammatory condition implicating the right diaphragm and liver ligaments. In hepatic abscess the symptoms are pronounced, and though there may be dyspnea, the preponderance of intestinal symptoms, as nausea, vomiting, loss of appetite and disturbed conditions of the lower intestinal tract, as diarrhea or constipation, will suggest hepatic disease as distinguished from supradiaphragmatic effusion or abscess, in which pulmonary symptoms will occupy the foreground. Dysentry, with discovery of amebæ in the intestinal discharges, will in the presence of inflammatory hepatic symptoms at once suggest hepatic abscess.

In a case of hepatic abscess observed recently by the writer, a so-called typical case, distinctive liver symptoms were not present. There were general symptoms of suppuration, chills, hectic fever and sweats, but the bulging upward of the liver gave rise to pronounced pulmonary and diaphragmatic symptoms, hepatic and intestinal symptoms being practically absent, and only at operation was the differential diagnosis between empyema and liver abscess established. The exploring needle had been introduced, but owing to the thinness of the diaphragm and the pressure of the liver upward against the chest wall, it could not be determined that the point of the needle remained in the pleural cavity. If this patient had been carefully observed from the first the diagnosis might readily have been made.

It is not always easy to determine whether a given abscess is situated in the abdominal wall, in the liver proper, or in the subphrenic space between the liver and diaphragm. In the first, respiratory and intestinal symptoms should be absent, and in the second the intestinal symptoms should not be pronounced as in true hepatic abscess. The history of the case should always serve to distinguish subphrenic or liver abscess from cholelithiasis or cholangitis with suppuration, the latter two conditions being more chronic and characterized by the classical symptoms of obstruction to the biliary flow.

In suspected hepatic abscess the aspirating needle should be introduced over the point of greatest prominence. In abscess of the liver due to amebic dysentery, brownish fluid containing the ameba coli is withdrawn. If there be no protrusion, and abscess of the liver be strongly suspected, the needle may be introduced in the seventh interspace in the midaxillary line or in the last interspace at the anterior axiliary line.

Hydatid cyst of the liver will not be confounded with liver abscess unless suppuration has occurred in the cyst, in which case, in the absence of a very definite history, a differential diagnosis will be difficult until the aspirating needle is used and fluid withdrawn, when the diagnosis will be clear.

The perforation in solitary abscess of the liver usually takes

place through the diaphragm and pleura, and finally into the lung, when the symptoms of empyema and lung abscess will be added, the patient expectorating sputa containing blood pigments and blood corpuscles, crystals of hematoidin, cholesterin plates and leucin and tyrosin. The perforation may also take place into the free peritoneal cavity, when a diagnosis will hardly be made during life. The abscess may perforate the stomach or bowel or even the pericardium, in which last case the exitus letalis immediately intervenes.

The complexion is muddy in liver abscess, but jaundice is rare.

The possibility of pus above or behind the diaphragm being the result of suppurative disease of the vermiform appendix is to be borne in mind in any case of suspected suppuration about the liver. The writer has found the inflamed appendix occupying a subphrenic position and held by adhesion in immediate contact with the liver. Many similar cases are recorded.

Septic fragments swept from an infected appendix have in well-authenticated cases produced pyophlebitis and liver abscess as a distinct sequela of appendicitis. The importance, therefore, of first excluding primary appendical inflammation in the diagnosis of all purulent conditions in the neighborhood of the liver and diaphragm should not be underestimated. In these cases the liver abscess, as in primary liver abscess, may push through the diaphragm by ulceration and suppuration and similate pleurisy with effusion, empyema, or gangrene of the lung. Deaver reports a case in which abscess following appendicitis discharged through the diaphragm and lung and finally through the mouth.

A distinct value should be attached to a history of previous attacks of gastrointestinal irritation and pain at McBurney's point. Retrocecal abscess attending appendicitis, burrowing high into the lumbar region, may simulate a purulent accumulation situated posteriorly in the cavity of the pleura; likewise a possible quick infection of the pleura from an appendicular lesion must be given consideration.

The following paragraphs, taken from the "Practical Medical Series" (Murphy, 1902), are interesting in this connection:

"That there should be any difficulty in discriminating between acute thoracic and acute abdominal lesions seems, on the face of it, absurd; yet in an experience of between 2,000 and 3,000 cases of acute abdominal disease the question has arisen often enough to make a deep impression upon Maurice H. Richardson. At first thought it would seem that acute abdominal symptoms occurring in the course of acute intrathoracic disease must indicate an abdominal complication; that there must be either an abdominal complication or intrathoracic disease or an intrathoracic complication of abdominal disease. Such complications are by no means unusual. A right-sided pleurisy or empyema, following an undoubted appendicitic—and especially in cases operated upon—is conspicuously a complication of the original disease, and directly dependent upon it, by the extension of the septic process through various channels. So, in acute pneumonia, there is no reason why there should not be at the same time an infection—diplococcal or other—of the appendix; it is easy of explanation and can hardly cause an error in diagnosis."

In some cases in which acute sudden pain in the abdomen, with or without other symptoms, suggests appendicitis strongly enough to justify the considerations of operation, thoracic symptoms are conspicuous, in others not prominent. In some the discovery of thoracic signs will establish at once the diagnosis, the pain and other symptoms of appendicitis being then regarded as physiologic rather than pathologic. "Not that an acute process may not start in the appendix at the same time as in the lungs; but such a combination, though possible, is so unusual as to justify elimination from the probabilities."

"In acute right-sided disease of the thorax symptoms of appendicitis may be so typical that unless the surgeon makes thoracic examination an invariable rule, he may be completely deceived, and, in a beginning pneumonia or pleurisy, operate or explore a normal appendix. The history of medicine and surgery is filled with examples of such errors."

Richardson reports a few such cases as follows:

Case I. Boy of six, pain and vomiting for five days. The boy

complained of the right iliac fossa alone. The appendix was removed but dyspnea and cough appeared, and an empyema on the right side was drained.

Case II. Boy of four, complained of stomach ache for several days; he had symptoms of commencing pneumonia as well as pain in the appendicular region. No operation; recovery from the lung trouble.

Case III. Girl of five, no suspicion of thoracic disease until, in suspected appendicitis, dullness was discovered in a routine examination of the lungs.

Case IV. Boy of four, abdominal pain when coughing, and tender over McBurney's point. Suspected appendicitis; had typical pneumonia.

Case V. Man, thirty-five, admitted with abdominal pain and rigidity, without tenderness. Next day pneumonia developed.

The writer recently observed a misunderstood case in which a diagnosis of appendicitis had been made in a boy of eight years. The boy was brought for operation. The temperature being unusually high for appendicitis, a careful general examination was made and a right-sided pneumonia was discovered, which yielded promptly to treatment. Later the appendix was removed. It was quite normal—that is, there was slight round-celled infiltration of the mucosa, but no other indications of inflammation. It should be noted that (perhaps owing to the difficulty of eliciting reliable subjective symptoms) these mistakes in diagnosis have occurred most often in children.

Though it is of rare occurrence, the infected gall-bladder may discharge its purulent contents into the pleura or lungs, and therefore in doubtful cases, or even in evident cases of subdiaphragmatic suppuration, it can not be completely exculpated.

Primary perinephritic abscess could hardly be mistaken for a subdiaphragmatic abscess except at the very beginning, before local edema and fluctuation develop. Such an abscess, however, may point upward and produce great dyspnea.

Abscess of tuberculosis of the spine may open into the pleura or lung or pass down behind the diaphragm. In abscess of an old

and apparently cured Pott's disease the local signs of inflammation at the site of angular deformity or of a lesion without deformity may be lacking, so that the surgeon may err as to the real source of the pus, unless a diligent search be made for points of tenderness and the case-history be very carefully investigated.

Most cases of true subphrenic abscess occur as the result of perforation of the stomach wall due to gastric ulcer, the shape and position of the abscess depending upon the site of perforation of the stomach wall. If the perforation is in the anterior wall of the stomach the space between the stomach and liver becomes filled with pus, and the fluid lies in a basin, the bottom of which, when the patient lies in the recumbent position, is the gastrohepatic omentum and the gastrophrenic ligament. Its walls are made up by the anterior surface of the stomach below and the diaphragm and abdominal wall in front. The anterior border of the liver may dip down into the pus. The fluid can not get behind the liver above because of the interposed coronary ligament. Adhesions limiting the downward extension of the pus are formed between the omentum and the parietes. Such adhesions, however, may join the liver margin to the omentum, in which case the pus does not rise up into the subdaiphragmatic area at all. Such an abscess may be—and, in fact, as a rule is—limited to the right or left side, usually to the left, by the falciform ligament of the liver. This means that adhesions have joined the omentum, the parietes and the edge of the liver at the notch, but have left the left lobe free. (Greig Smith.)

The second variety of abscess develops after perforation of the posterior wall of the stomach, and occupies the lesser cavity of the peritoneum. It may also arise from perforation of the duodenum on its perineal side or from infection of the pancreas or spleen. The truly subphrenic portion of such an abscess is on the posterior half of the diaphragm behind the coronary ligament, involving the surface of the Spigelian lobe of the liver, the size of the abscess and the extent of its development downward depending upon the position where the omental folds adhere and on the amount of fluid diffused. Reports of such cases do not state whether fluid passes through the foramen of Winslow.

Subphrenic abscess may arise by the burrowing upward of pus from a suppurating kidney, or from appendicitis with retrocecal abscess from perinephritic abscess, or from rupture of the duodenum where it is uncovered by the peritoneum. (Greig Smith.) Subdiaphragmatic abscess due to anterior perforation of the stomach may extend as high as the angle of the scapula, in such case simulating pleural effusion. Respiration may be greatly embarrassed by the upward pressure upon the lung and heart. Occasionally gas is formed in connection with the abscess, and amphoric sounds are heard on auscultation and percussion over both chest and abdomen. This is the so-called "pyopneumothorax subphrenicus." In any case of subphrenic abscess due to stomach perforation the precedent signs of rupture and peritonitis will be of deciding value in diagnosis. A history of the well-known signs of gastric ulcer, coupled with those of acute or chronic perforation, should clear up any doubt.

In subphrenic abscess the location and size of the pus-sac must be determined by the physical signs, as swelling or bulging in the upper part of the abdomen, and changes in the percussion-note over the lower chest and upper part of the peritoneal cavity. In abscess due to anterior perforation of the stomach the protrusion is most marked about the epigastrium, raising the abdominal coverings below the xiphoid cartilage. Whether the abscess be upon one or the other side of the falciform ligament, the whole upper epigastrium bulges.

In the second variety the protrusion is lower, even to the umbilicus. In retroperitoneal subphrenic abscess there may be no protrusion, though a great quantity of pus may have collected behind the peritoneum. If the abscess has fully developed after anterior perforation, palpation and percussion may reveal fluctuation, but in many cases the abscess is small and never comes to the surface, in which case physical signs give no help in diagnosis, the history of ulcer, rupture with sudden acute epigastric pain and collapse and the characteristic constitutional symptoms of abscess, as rigors, hectic fever and sweats, with the well-known blood changes of abscess, constituting the most important evidence. We have little

knowledge of these forms of abscess, therefore absolute precision in diagnosis is not possible. Subdiaphragmatic abscess may cause an apparent enlargement of the liver, the accumulation above the diaphragm causing the liver to be pushed downwards.

Purely diaphragmatic abscess may follow amebic dysentery, the liver parenchyma being uninvolved, the abscess developing on the convex surface of the right lobe of the liver near the coronary ligament, if not evacuated the lung later becoming involved. Councilman assumes that in this case the infection takes place through the peritoneum.

A localized circumscribed peritonitis in the upper part of the abdomen may always be diagnosticated if, in addition to its classic symptoms, the fact of an extension of inflammation from neighboring viscera or perforation of the viscera can be brought out. From such a localized peritonitis, a subdiaphragmatic abscess may form, or there may develop an abscess containing air and pus, the pyopneumothorax subphrenicus previously mentioned. If the suppurative inflammation of the subphrenic space follows disease of the pancreas, it is usually limited to the cavity of the lesser peritoneum. Such a condition can only be recognized by the history of previous disease and the resulting extension or perforation.

Blood Examination.—In all purulent conditions the protoplasm of the leucocytes possesses an affinity for iodine. This may be shown by staining with a weak solution of iodine in combination with potassium iodide, as in the reagent recommended by Goldberger and Weiss. In preparations thus treated the iodine solution produces a more or less pronounced brown staining of the entire protoplasm and a more intense staining of the granules. In normal blood the nuclei take up little or none of the stain, and the protoplasm is stained a pale yellow. This reaction, which is constant in all purulent conditions, may appear in many other diseases, and its intensity, as remarked by DaCosta, bears no parallelism to the extent of the pus collection. The diagnostic value of this test is, therefore, limited. Its constancy, however, in abscess becomes of some value in diagnosticating a deep-seated purulent condition, if the other causes which may give rise to the

reaction, such as septicemia, pneumonia, pulmonary tuberculosis, malignant disease, severe anemia, leukemia and pseudoleukemia, can be ruled out.

It has been observed that in abscess the blood coagulates somewhat more slowly than in the normal state, and that under the microscope the fibrin network is abnormally dense. This is not true of purely tuberculosis or cold abscesses, a circumstance which should have consideration in differential diagnosis. Recently, in the practice of Dr. Hope, of Coatesville, Indiana, a case of post-mortem proved to be liver abscess which several skillful physicians had diagnosticated as tubercular peritonitis. A blood examination in this case would have added very useful evidence.

Absorption of toxic material from an abscess may develop anemia, the severity of the anemia varying in a direct proportion according to the size, depth and chronicity of the abscess and the toxic potency of the absorbed material. Even in acute cases there is usually more or less diminution of the amount of hemoglobin. DaCosta briefly estimates the importance of numerical changes in the leucocytes as follows:

Practically the same influences governing the behavior of the leucocytes in most other infections also determine their increase and decrease in abscess. Thus in both trivial and extensive pus foci the number of leucocytes may be normal or even subnormal —in the former instance because systemic reaction is not provoked, and in the latter because it is overpowered. Leucocytes may also be absent, in case toxic absorption is impossible, owing to the complete walling off of the abscess. In all other instances save these a definite and usually well-marked leucocytosis occurs, amounting on the average to a count of about twice the mean normal standard, but frequently greatly exceeding this figure in the individual case. The size of the primary abscess can not be estimated by the height of the leucocytosis, but a tendency of the pus to extend is almost always accompanied by a distinct increase in the number of cells in excess of the figure originally estimated. Complete evacuation of the abscess is soon followed by a disappearance of the leucocytosis, but so long as the pus remains ineffectually drained the high count tends to persist.

Pertaining to the blood changes in purulent conditions about the diaphragm, we find the following: In abscess of the liver leucocytosis is very marked. The blood in this condition can not be distinguished from cholangitis with suppuration, but Cabot calls attention to the fact that it may often be distinguished from cancer of the liver by the absence of increased fibrin network in the cancer, this being always increased in suppuration. Gall-stones do not produce leucocytosis, by which fact cholelithiasis may be distinguished from inflammatory or suppurative disease of the peritoneum, vermiform appendix, liver or gall-ducts, with which conditions cholelithiasis might be confused.

In pus accumulations above the diaphragm there is always leucocytosis. In purulent conditions implicating the peritoneum the leucocytosis, other things being equal, is more pronounced. Any inflammation of the peritoneum is more serious clinically than a like inflammation of the pleura, and the inflammation of the peritoneum, whether serous or purulent, causes the more marked leucocytosis. In this connection Cabot says that almost all cases of general septic peritonitis show very marked leucocytosis, and the spreading of a localized process is always indicated by an increasing leucocytosis. But here and there it happens that the patient can not react against the disease at all, and then the leucoctytes are normal or diminished. This never occurs in empyema, because the system is never so overwhelmed by a septic process in the pleura.

For the same reason the estimation of the leucocytosis may be of some value in distinguishing between perinephritic abscess and abscess within the cavum peritonei, as the pericecal, subphrenic or hepatic abscess, in any one of which conditions the peritoneum may be extensively implicated.

In abscess of the lung expectoration of pus and other unmistakable symptoms give information to which the examination of the blood can add nothing. In so much as gastric ulcer is the common precursor of subphrenic abscess, it should be noted that in the former condition a severe anemia is common. The color-index is low and leucocytosis is practically never seen except after hemorrhage and during digestion.

DISCUSSION.

Dr. Walker, of Evansville: In these cases the physical signs are the ones I have relied on. Dr. Eastman speaks of the use of the aspirating needle. I think that is the most unsatisfactory and dangerous way possible. I remember years ago of seeing a patient die of collapse from the induction of an aspirating needle. The surgeon thrust in the aspirating needle and the patient collapsed immediately. On a post-mortem we found it had ruptured a large abscess. I can not agree with the doctor on this point. With regard to the blood examinations, it seems there is so much doubt that at least for the ordinary physician it is not practical. There are so many exceptions that the examples Dr. Eastman gives are really of but little use.

In regard to the cases of pneumonia that may be taken for appendicitis, I think that danger is far-fetched; a few instances do not establish the point at all. In pneumonia, while pain in the lower right side is often complained of, it will not be difficult, I think, to differentiate these cases. It is altogether possible that some interabdominal condition may exist in cases such as the doctor describes. I think, generally, if you diagnose a case as pneumonia and find those symptoms down there, you will find something else that penumonia does not account for. In fact, the diagnosis of these cases depends upon the physical signs, the enlargement of the side, the bulging either of the side or the epigastrium being pressed up.

Dr. Peyton, of Evansville: The doctor certainly presents the subject in a very masterful way. I do not agree with Dr. Walker in condemning the use of the aspirator. The doctor, it is true, may have seen some unfortunate results from its use, but, taking as a basis for my statement his own statement that one or even several instances can not be accepted as a criterion to govern our opinion of this matter, the use of the aspirator oftentimes—at least that has been my experience—has proven valuable in clearing up these cases. I wish to add, however, that a negative result by the use of the aspirator does not mean that you have not got

pus. I think that Dr. Eastman's statement that an examination of the blood will clear up a diagnosis is certainly of great value.

Dr. Sharp, of Jeffersonville: I had one case in which the man complained severely of pain in the appendicular region. I cut down upon the appendix, found it perfectly normal, but removed it. The man made an uneventful recovery from this operation, and was apparently relieved from his symptoms. In about thirty days, however, he came to me again, suffering pain in the same region. By this time there was some bulging in the hepatic region, and an abscess appeared, ruptured through the diaphragm and was discharged through the lung.

Dr. Hayden, of Evansville: I saw a case a few years ago that apparently was a typical case of appendicular abscess. I was called to see the case about the third day after it was diagnosed as appendicitis. We afterwards found a pericardiac abscess. We found colon bacilli in the pus. This proves that an abscess in any part of the body may have had the germs carried from some other part to produce that abscess.

Dr. Thorne, of Kokomo: I remember one case that was operated on. Ten days afterward the patient developed a chill and a very high temperature, with extreme pain in the right side, afterward in the back. There was no enlargement of the liver or abdomen. She became worse for a few days. Her blood was examined and found to be pure. We thought possibly there was an abscess of the liver. The aspirator showed this not to be the case. We then decided the cause to be grip. I have seen cases where the abscess in the left lobe of the liver was relieved by operations from the left side.

Dr. Welsh, of Shirley: This is interesting to me because of a case in my own family. My brother had pain over the liver after an attack of typhoid fever. Exploratory aspirations were made, thinking the abscess was in the liver. We did not find any pus and prepared for an operation. We aspirated after an incision into the liver, and not finding any pus, aspirated higher up and found the fluid above the diaphragm. There was probably a half

pint. Two years afterwards he was operated on again, the sinus not healing, and we found a large sinus on the right side pointing toward the heart. He still has a sinus three inches in diameter, and suppurating. The pain was never located over this place. He is better now than he has been at any time since the beginning of his trouble. He was aspirated four times at one sitting, and two or three times before that without any trouble following the aspirations. Perhaps it would have been better if he had been aspirated a few times more; it might have stopped that incision in the liver.

Dr. J. R. Eastman, of Indianapolis: I have little more to say but to thank you for so courteously discussing my paper. I disagree with Dr. Walker as to the importance of this matter. I do think errors occur more frequently than we realize.

CLUB-FOOT.

BY J. H. OLIVER, M.D., OF INDIANAPOLIS.

I will call your attention briefly to a condition, the consideration of which has figured prominently in medical literature from the beginning of the surgical era to the present time. A condition especially aggravating to human kind because so plainly apparent when uncorrected that it calls forth unfavorable comment and ridicule, can not be hidden by artificial means, and incapacitates the individual to a greater or less extent. It has changed the destiny of individuals and its characteristic gait and footprints can be found in the pathway of nations. It drove Talleyrand into the church, made a pessimistic misanthrope of Lord Byron, and because a royal princess was born with club-foot, crippled by artificial imitation the whole female population of China.

Club-foot, or, in more technical phrase, talipes equinovarus, has always demanded the most respectful consideration from the medical profession. It was not, however, until the advent of subcutaneous tenotomy, popularized and made practical by Stromeyer, in the early part of the last century, that anything else than purely mechanical methods were used for its correction, methods which then as now, when unassisted, gave very unsatisfactory results. This condition is both congenital and acquired, and it is to the congenital form of the trouble that I invite your attention.

The deformity itself consists of an inversion, torsion and depression of the front part of the foot and elevation of the heel; the inversion becoming eventually, as the deformity increases, a pronounced dislocation at the mediotarsal joint, the whole condition seeming to be resultant from an abnormal rotation of the tarsal bones upon an anteroposterior and transverse axis. The as-

tragalus being the all-important bone in the make-up of the two bony arches of the foot, the keystone, in fact, plays, of course, the most important role in the production of the deformity. The navicular bone articulates to a greater or less extent with the side and under surface of it, leaving the head uncovered and plainly apparent on the dorsum of the foot. The cuboid follows the navicular and its articulation is found abnormally to the inside on the anterior articular facet of the os calcis. The bones anterior to the navicular and cuboid, the cuneiform and the metatarsals, especially the three inner ones, follow in the same plane of rotation and displacement, while the os calcis, rotating on a transverse axis, is changed more to a vertical than a horizontal plane. The muscles, tendons and fascia accommodate themselves to the abnormalities of the bony framework; their shortened condition and rigorous resisting power form in the young subject a greater obstacle to correction than the bones themselves. This is especially true of the tendons of the anterior and posterior tibial muscles, the plantar fascia and the tendo Achillis. The result of this is a muscularly unbalanced foot, the internal muscles, especially the tibials, being shortened, vigorous and active, while those on the outside of the foot become weakened and elongated by overstretching. The child at first begins to walk on the outer edge of the foot with the heel slightly elevated. Muscular contraction in an abnormal plane and the displacement of the normal center of weight bearing on the arch of the foot constantly aggravate the condition. Eventually the individual walks well over on the dorsum, and the foot is so displaced that the anterior part forms wellnigh a right angle with the posterior portion, compelling the lifting of one foot over the other in walking, necessitating an unsteady, very conspicuous, and seemingly painful method of locomotion.

The causation of this condition is as yet unknown, there being, to the writer's mind, but one plausible theory offered. Eschrischt and Berg (I quote from Whitman) have claimed that at about the third month of intrauterine life the thighs of the embryo are abducted, flexed and rotated outward, the legs are crossed and the feet are plantar flexed and adducted, so that the inner surfaces

of the thighs, the tibial borders of the legs, and the plantar surfaces of the feet are held in close opposition to the abdomen and to the pelvis of the fœtus. At a later period there is an inward rotation of the legs so that the feet are turned gradually outward until the soles are brought into contact with the uterine wall, the feet then being in the attitude of abduction and dorsal flexion. If this outward rotation is checked or only partially completed then the retention of the member in the position of deformity throughout the intrauterine life of the fœtus so molds the parts that we have at birth this well-known deformity. It has been further claimed that a scanty supply of amniotic fluid is the prime factor in the production of the above described phenomenon; this remains as yet to be demonstrated.

The deformity increases after birth because of the disassociation of the astragalus with its associated bones and the distorting effect of the muscles acting in an abnormal plane, aided and abetted as the child begins to walk by the superincumbent weight.

To me this theory seems plausible, but it has been vigorously assailed. Nevertheless it would seem as though so stereotyped a deformity must have a similarly stereotyped cause. I can conceive of no cause that would not have for its foundation a checking or retardation of a normal succession of attitudes or postures of the fœtus in utero.

Passing to the treatment we must pause to note with pleasure that with each advancing decade the prognosis grows brighter, until at the present time, in infantile cases and those of early childhood, barring some slight discrepancy in size, we can almost prognosticate perfect results. Patience and vigilance and loyalty to the surgeon are prime requisites, however, and the dictum that half cures are no cures should always be impressed upon the minds of those most interested, and remembered by the surgeon himself.

The essence of the treatment of this condition is briefly summarized by Bradford under two heads: First, rectification of the misplaced bones and a lengthening of the shortened and contracted tissue; second, retention in a normal position until the abormal facet of the astragalus and the other tissues become, under the pressure of the new position, normal.

The first of these is best accomplished by manipulation, gentle or forcible as the resistance develops, assisted by tenotomy, open incision, osteotomy, and ostectomy if occasion demands. It short the deformity must be corrected—even more, over-corrected. If gentle means will not avail then forcible ones must prevail. If manipulation will not do, the knife and the osteotome must be called into play. The more I deal with the human foot the more I am astounded at the amount of trauma it will withstand. It would be well, however, to bear in mind the note of warning sounded by Lovett that the amount of over-correction should be carefully guarded lest a condition of permanent valgus result due to unnecessary destruction of the arch.

The second proposition is purely a mechanical one. We must find some means of holding the foot when corrected comfortably and surely in its new position until the normal habit is formed and all danger of relapse is long passed. It must be a mechanism which will allow of locomotion, for after correction is made there is nothing that will sooner remold the abnormal facets and stretch the shortened tissues than normal weight bearing. It must be rigid and unyielding at first, this to be followed by something pliable, something that will give more play to the muscles and greater freedom of movement to the long imprisoned joints and yet resist the ever present but declining tendency to recurrence. We must have a functional rectification as well as a rectification of the deformity, and the adage, "half cures are no cures," must constantly ring in our ears.

When shall the treatment begin? As soon as we get the patient? In neglected cases, yes. But the newly born, I am inclined to think, should have time to dry out and season, to become accustomed to atmospheric air and other mundane conditions before being subjected to surgical procedures. The end of the third week, or even the fourth, is soon enough. This time is not lost, for the mother or nurse must be taught to manually correct the deformity every time the napkin is changed and to hold the foot in a corrected position for some minutes.

For convenience we will now divide our cases into infantile and neglected ones, and the details of the treatment first described

will apply to all infants during the first year. In these cases the use of the tenotome is rarely if ever called for, and I do not believe in even the division of the tendo Achillis until the child begins to stand on its feet and walk. The vast majority can be thoroughly over-corrected by other means. Under chloroform anæsthesia, with the patient on a table of convenient height, the operator seated facing the feet, the heel and posterior part of the foot is grasped in the thumb, index and middle fingers of the convenient hand, while with the corresponding fingers of the other hand the foot is gently rotated and twisted outwards, the thenar eminence of the holding hand offering a well padded fulcrum over which to bend the foot. This must be kept up with gradually increasing force until the foot hangs limp and is easily put in a position of over-correction. It may take some time to accomplish this and the resistance at first may seem almost too great to overcome in this way. About the only thing that Lorenz has taught us in the treatment of club-foot is persistence in manipulatory effort, and here patience and persistence will accomplish the desired result.

Equinus is a secondary deformity and is not usually very pronounced in the young infant. To overcome this the child is turned on its stomach and the leg flexed to a right angle at the knee, then grasping the whole foot in the hand so as to make a lever of it, by repeated dorsal flexions at the ankle joint the gastrocnemius and soleus are gradually stretched and the equinus overcome. In the same manner the supinated foot is repeatedly bent outward and this condition conquered. The member, perfectly limp, reddened and congested from manipulation, is ready for the retention apparatus. We must now decide what that shall be.

A moment ago I stated that there were two mechanical periods, and that in the first of these we must have an apparatus that was rigid and unyielding. It may be made of metal, as the Judson club-foot splint is, or it may be one of the many shoes that have been devised for this condition, which, in the hands of their inventors, have undoubtedly given good service. But there is nothing which seems so completely to fill all the requirements as plas-

ter of paris. The bandages should be fresh, made of hospital crinoline and good plaster and not over two inches in width. To find some way to hold the foot in the proper position for the application of the plaster was to me quite a problem. Wolf devised the method of using adhesive plaster bands, beginning on the dorsum of the foot over the metatarsophalangeal articulation of the great toe, crossing diagonally to the outside of the foot and up the leg, to be incorporated in the plaster at the top of the splint. I used this method for some time, but the rectification so obtained was not satisfactory, and the adhesive plaster confined under the plaster of paris frequently irritated the tender skin. I finally adopted the plan of attaching the plaster at the same point of beginning and pasing it directly across the front of the sole and the under surface of the fourth and fifth toes, to be held by an assistant some several inches from the foot so as to be clear of the movements of the surgeon in applying the bandage. The assistant grasping the knee-joint with the convenient hand, makes steady traction outward and upward upon the plaster strip, at the same time making counterextension by rotating the limb inward. In this way a marked valgus is produced and the equinus completely or largely overcome, the degree of correction and over-correction being wholly under control. If the plaster strip across the anterior portion of the sole of the foot does not completely correct the supination a second strip is applied, beginning just below the internal malleolus, and is carried directly across the tip of the heel to the hand of the assistant. The folds of skin about the external malleolus are then thoroughly anointed with vaseline and the whole foot and leg generously sprinkled with talcum powder, care being taken to get a plentiful supply of the same between the toes. This I prefer to absorbent cotton pledgets in this locality. One layer of glazed wadding bandage is then applied neatly and without wrinkles, and then the plaster of paris. It is important that the plaster be applied tight enough to prevent the foot rotating inside the splint, and yet not tight enough to cause pressure troubles. As soon as the plaster has begun to harden a smooth block of wood should be applied against the sole of the foot and the remaining equinus completely overcome. At the same time the operator should dili-

gently rub and mold the bandage to the foot and about the malleoli and eliminate any wrinkles which may be thrown up across the ankle by the increased dorsal flexion after the bandage is applied. The adhesive plaster strips are now cut off close to the bandage, and the dressing is complete. There should be little or no pain following such a procedure, although there usually is some swelling and soreness caused by the manipulation.

This splint may be worn for six or eight weeks before changing, and as a rule the reapplication should not be attended with much difficulty. I rely on this method of dressing until the tendency to recur is largely overcome and the muscular balance of the foot has in the main been re-established. It may take three months, it may take six, it may take longer. If the child wants to use his feet he is encouraged to stand on them and walk if he can.

At the end of this period I make use of one of the oldest and simplest mechanical devices, consisting of a snug-fitting laced shoe with the shank cut and the front part of it shoved over five or six degrees into over-correction. This is fitted with steel insole and a toe clip on the inside corresponding with the metatarsophalangeal articulation of the great toe, and a hook on the outside for a rubber muscle if there is still a tendency to equinus. This shoe is set into a double bar brace hinged at the ankle and knee if necessary. If there is marked inward rotation of the legs I run my outside bar up to a pelvic band, but I do not often find this necessary. To still further guard against a tendency to supination I have a triangular pad stitched to the outside of the shank of the shoe, the two other ends of which pass respectively in front and behind the ankle-joint to buckle to the inside bar. In addition to the rubber muscle in slight equinus I frequently use a locking device at the knee and add a thickness of sole leather to the bottom of the foot and compel the child to stand or walk stiff-legged for a limited time each day. In this apparatus the child passes what may be called the second period of treatment—six months, eight months, a year, or more. "Half cures are no cures." We now drop off from time to time the accessories,—the rubber muscle, the locking device at the knee, the

steel insole, the triangular pad, the toe clip, and finally, when the child is able to walk barefooted without any tendency to recurrence, or with only a slight in-toeing, the brace itself.

During a large part of this period the brace should be worn night and day, the bedding being protected by sleeping bags, but should be removed morning and night and the limb carefully bathed and massaged.

The third period now begins and is one of supervision only. The child should call for inspection at first every week and then at longer periods. The shoes should be examined, and if the soles show undue wear on the outer side it is proof conclusive that the weight is not being evenly distributed and the outer side of the sole should be thickened up an eighth of an inch or more. If there is still an inclination to toe-in—and there frequently is—I advise that the child be sent to dancing school or placed in the hands of a competent physical director as soon as possible. This education of the feet is a great help in the correction of minor shortcomings.

So much for the infantile cases, and now as to the neglected ones. In mild cases and those of medium severity up to several years of age the foregoing methods, aided by a few tenotomies and fasciotomies, a greater amount of time spent in the primary correction, and more force, will accomplish the same desirable result. Instead of using the hand as a fulcrum Kœnig's wedge-shaped block may be called into play, or Thomas' talipes wrench, but I have found few cases that I could not manage with my hands. The plantar fascia frequently demands division, and the tendo Achillis nearly always. Occasionally the anterior tibial tendon and in a few cases the tendon of the tibialis posticus need similar division. The condition of equinus is not always as easy of correction after tenotomy of the tendo Achillis as is generally supposed, it frequently taking quite an amount of force, and in a few instances I have been compelled to re-insert my tenotome and divide the posterior ligament of the ankle-joint before the desired rectification could be made.

In speaking of tenotomies let me call attention to the great advantage of a blunt-pointed instrument. It enables the operator

to feel his way, as with a probe, without the danger of transfixing and only partially dividing a misplaced tendon.

In resistant and neglected cases the writer is an earnest advocate of the Phelps open operation, and if, after the free division of all the contracted tissues the foot is not easily placed in the desired position, of further doing osteotomy of the neck of the astragalus. I have not found it necessary to attack the anterior portion of the os calcis in a similar manner, and have never resorted to removal of any of the tarsal bones, or to cuneiform osteotomy. In old inoperable cases I am a believer in amputation even if it involves both extremities, and am firmly convinced that an individual so affected would be made more comfortable, both in mind and body, with a pair of modern artificial legs.

DISCUSSION.

Dr. H. R. Allen, of Indianapolis: I should like to make a few remarks in regard to the paper just read, which I have enjoyed very much. Dr. Oliver is aware that I feel very deeply on this point. When I was 16 years old I started in on this work of making braces, following out one device or another for curing club-foot, and to hear of open operations grates upon my nature. There is one point the doctor mentions, and that is in regard to the Chinese ladies being marked with a club-foot deformity. That is not correct. The method of binding the feet of the Chinese ladies has not been changed in modern times. The description Dr. Oliver gives is good. I think in our text-books Royal Whitman has the best description. In most of our orthopedic books we do not have real mechanics; we have simply orthopedic novels. For example, you will find they advocate the use of plaster of paris right along through their treatment of almost all deformities. Gentlemen, that is not mechanical. The Phelps operation is a good open operation, but it does not always succeed. Here is a girl with a half amputation with the Phelps open operation, and this is how she came to me. [The doctor exhibited a cast.] It is a fine art to correct a deformed foot. There must be an age limit

somewhere, of course. I have had patients between 50 and 60 years of age. I have downstairs a shoe belonging to a Canadian giant. He gave me one shoe and kept the other. All that was necessary in his case was three tenotomies. It took eleven months. Bones are plastic to a certain degree; you can model bones. Tubercular bones are plastic. Look at the results you get in Pott's disease. I would not say that some of the dense bones would be plastic under any condition. In club-feet most of you advise overcorrection to the point of a flat foot. The goal all orthopedic men seem to seek for their patients is a flat-footed heaven. They substitute one deformity for another. I don't believe in that. Dr. Lorenz, while here, did not advocate a flat foot. Dr. Oliver advocates the Thomas wrench. Such a wrench applied on one of those feet will mash the metatarsus joint. The wrench may be of assistance, and very likely is, but it is not essential, and I believe it is an incorrect way of getting at the true solution of the correction of club-foot.

There is one thing the doctor did not lay much stress on, and that is the twisting of the tibia. Our text-books, or the most recent ones, put quite a little stress upon the twisting of the tibia. Some of them will go to work and do osteotomy and split right through the tibia. That ought not to be cut across and twisted at one point. I am opposed to the use of plaster of paris in the treatment of club-foot. You will find most of the cases where plaster of paris is used are done up in this way: They take a foot, bandage it up, and use wedges of gauze or cotton and adhesive plaster. These things cover a multitude of sins, in my opinion. Now, what is going to keep the foot inside that bandage from turning around? Here is your shaft inside the dressing, and it will turn around. Dr. Oliver mentions one brace that comes up to the pelvis to prevent toeing-in. You don't have to go up to the pelvis to stop that; there are mechanical ways short of that.

Now, I don't expect to convert all of you to my theories. If I get one of you a year I shall be satisfied. If I have been overenthusiastic I don't want you to think it is personal, but I am so interested in this subject and feel so deeply about it that I can not help speaking as I do.

Dr. Jared Spooner, of Peru: Dr. Oliver said a half-cure is no cure. I should like to ask if that applies to all cases? Recently I have tried to effect a cure, or a partial cure, of club-foot in a middle-aged person, a large, heavy, old woman. Her condition became intolerable, and in making an operation of osteotomy I got the foot down flat, but I haven't a perfect cure. Yet I do not feel humiliated on account of that partial failure. I thoroughly agree with the doctor in this regard; I believe an amputation would be preferable to her condition prior to the operation. I think, however, I now have a foot that it a little better than an artificial foot.

Dr. M. F. Porter, of Ft. Wayne: I think perhaps the truth lies somewhere between the extremes in this matter. The man who applied plaster of paris to a foot like that [exhibiting model] does not know how to apply it. Plaster of paris applied to a foot that bunched it up like that was not applied properly. The man who would make a Phelps operation to bring out a result like that does not know how to make an operation. [The doctor exhibited another model.] I think the truth is somewhere between these extremes. I quite agree with what Dr. Allen says about the rotation of the leg inside the plaster of paris bandage; and I am also very well aware of the fact that it is very difficult to hold a foot in a proper position while the bandage is being applied and while it is hardening. The devices referred to by Dr. Oliver will help, but one of the hardest things that I have to contend with in the application of plaster is the uncertainty as to whether I had my limb in the position I wanted it in, and then succeeding in keeping it there until the plaster hardened. Another point should be taken into consideration, and that is the drying out and shrinking. I have never been attached to any one particular method, either in this or in the treatment of hernia. I don't believe it can be truly said the Phelps operation is the best operation, or that the forcible righting of the parts at one operation is the best. I have had some of the nicest results from the Phelps operation. I am not in favor of operative procedures at all in children. I

think perhaps we will find the truth about half way between the extremes.

Dr. Oliver: It was not my intention to give the impression that all Chinese women had club-foot, but as the resultant of a case of club-foot in the person of a Chinese princess born many hundred years ago, as tradition has it, an edict went forth that all Chinese female infants should have their feet deformed, and this was the beginning of the senseless and cruel bandaging that has come down to the present day. Unhappily for us, the mechanical principles which underlie the shaping of wood and iron do not apply to the shaping of flesh and bone. Rotation or twisting of the tibia is at times a troublesome condition, but it can be controlled with plaster by flexing the leg and carrying the plaster above the knee joint as well as by any other kind of apparatus. I am not, however, tied to plaster of paris, and frequently have occasion to resort to other means; but in the larger majority of cases it answers all requirements. What I particularly wished to emphasize was the method of holding the foot in its corrected position by adhesive plaster straps until the plaster of paris was applied and had hardened. This can be done absolutely.

THE TYPHOID ULCER—ITS SURGICAL ASPECT.

BY THOMAS B. NOBLE, A.M., M.D., OF INDIANAPOLIS.

From the reports of the Indiana State Board of Health we learn that there were 1,329 deaths in this State from typhoid fever in 1900; in 1901 there were 1,198; in 1902, 1,217; in 1903, 1,013. The mortality of this disease ranges from 7 to 20 per cent. For the sake of argument let us admit a death rate of 10 per cent. This gives the number of cases of typhoid fever occurring in this State, then, as 13,290 for 1900, 11,980 for 1901, 12,170 for 1902, 10,130 for 1903, and a total number of cases for the last four years of 47,570.

It has been pretty clearly shown and is now generally admitted that about 3 per cent. of all cases of typhoid will have perforation of the bowel, which means that approximately 356 cases of intestinal perforation, as a complication of typhoid fever, occur in this State every year. These cases all die; and of our cases of typhoid 356 will die this year and each succeeding year unless an added impetus be given the profession to the end that greater care be exercised in each case and a prompt and proper line of therapeutics be pursued. Physicians and surgeons of our neighboring States are recognizing these cases and are reporting their cures—why not we?

No case of this character has been reported to this association, so let us consider the subject for a while in order that we may the better be able to anticipate the dreaded complication or recognize it in time to save the unfortunate patient after it has occurred. There is nothing in the whole field of medicine or surgery which demands more from the attendant than perforation of the bowel in typhoid fever. It is certainly the psychological moment during the progress of this disease. When treated expectantly, practically all cases die. The severity of the attack bears no relation-

ship to the certainty with which perforation may occur. It happens in cases of the mildest form as well as in those of the severer type. It occurs with greatest frequency in males between twenty and forty years of age. Men suffer with the complication more frequently than women in the ratio of three to one. The seat of the perforation may be in the jejunum, ileum, appendix or colon. In the vast majority of cases it is found in the first twenty inches of the ileum upward from the ileocecal valve. Next in order of frequency comes the appendix and caput coli, the sigmoid and jejunum—the last named portion of the intestine being so infrequently perforated as to be given no consideration by some authors on the subject. The causation for the frequency with which the last few inches of the ileum is perforated has not been fully explained, though it seems to me to be a logical sequence, as here we have intraintestinal tension increased by the action of the ileocecal valve, the intestinal wall is here thinner, and the gut has in this locality a lesser blood supply. The size of the perforation varies from an almost imperceptible point to a rent covering half the circumference of the intestine. It may happen at most any time during the course of symptomatology. The symptoms of perforation may be the first to call attention to the underlying pathology (as in a recent case of my own), or they may not show themselves until convalescence is well established. The case referred to was one in which perforation occurred in the first week, the symptoms being those of a perforation appendicitis. The appendix was promptly removed and the case recovered, though he passed through five weeks succeeding with all the frills of typhoid, including intestinal hemorrhage, phlebitis, etc.

Perforation will take place during the third or fourth week in most all cases, as by this time necrosis of the bowel will have been complete or regeneration will have been established. Fortunately, as a rule but one perforation takes place. Multiple perforations have been encountered, though rarely. Out of about 250 operative cases so far reported the following can be said to be the rule: A single perforation will occur somewhere in the last twenty inches of the ileum during the third or fourth week in 3 per cent. of all cases of typhoid fever. Twenty-seven per cent. of these cases have

been cured by prompt recognition and proper surgical intervention, which otherwise would certainly have died. Successful treatment can attend, then, a correct interpretation of symptomatology coupled with prompt surgical intervention. What will be the symptoms to warrant so serious a procedure as an abdominal operation in the midst of a disease which has already brought the patient into conditions of profoundest gravity? The correct answer to this question is attended with many difficulties. Subjective signs may be totally absent owing to stupor or the semiconscious condition of the patient. And tympany or concealed hemorrhage may be present to still further entangle the observer. There is always present abnormal conditions in the skin, facial appearance, tongue, temperature, pulse, etc., and out of this array of abnormalities we are called upon to gather such additional symptoms as when put together will warrant the diagnosis of intestinal perforation. This can rarely be done with absolute certainty, but there are signs sufficiently significant to demand at least an exploratory incision. These signs are:

First, sudden regional or focal pain;

Second, muscular rigidity;

Third, nausea and vomiting;

Fourth, noticeable disturbance of the pulse and temperature curves.

The pain is especially significant if it comes on suddenly, is severe, and is referred to the right iliac region. Sudden focal pain of a lancinating character, which in the course of a few hours gives way to a more diffuse soreness less in severity, is eminently diagnostic of perforation. In suspected cases or in those in which this sign is not well marked because of the possible comatose condition of the patient it should be sought after with the tip of the finger. If ulceration has extended to the peritoneum there will exist a focal peritonitis which may be recognized in this way. An operation at this time, the so-called "preperforative stage," is ideal. Muscular rigidity is very common and attends and varies in degree with pain and tenderness. It is particularly prominent early in the complication, but may give way to distension or be absent as the general sensibilities becomes obtunded.

Nausea and vomiting will occur in possibly half the cases. It is a very valuable adjunct in symptomatology, especially if it has not existed before and is closely associated with pain and rigidity. The temperature and pulse, as a rule in typhoid fever cases, present a pretty regular irregularity. So uniformly does this occur that every one knows the typhoid curves which present the expected morning remissions and evening exacerbations. But let some complicating or extraneous influence come in and we see these lines broken up.

Mental disturbance, indiscretions in diet, hemorrhage, and any of the complications resulting from mixed infection or metastasis will cause fluctuations in the temperature and pulse curves; so that, taken alone, these deviations do not necessarily mean much, but when occurring in conjunction with the foregoing symptoms they become decidedly confirmatory of a perforation. The temperature may fall at the time of perforation to normal, or even subnormal, but will rise again in a few hours, and may go to 105 or 106 degrees F. The pulse may drop as low as 60 degrees, to again run up as high as 120, 140, 160 degrees, and higher. But it must be remembered that the pulse and temperature follow no fixed rule in figures. As to the toxins from the typhoid bacillus, the streptococcus, the staphylococcus, the colon bacillus vary in quantity and virulence, and as does absorption from the peritoneum vary, so will we find a corresponding variation in the pulse and temperature in different cases. Perforation may occur suddenly in the midst of an infection so virulent as that when it is thrown into the circulation no reaction takes place, and death in collapse is the result. Or the perforation may be so small and insidious and the infection so attenuated as to produce but slight, if any, changes in the pulse and temperature.

While it must be admitted that there is no symptom or set of symptoms pathognomonic of perforation, yet if the physician be careful in his examinations and be constantly on the alert for such a complication, and ever mindful of the significance of the symptoms already enumerated, it will rarely happen that a perforation will escape his notice before it is too late for proper treatment. When perforation occurs, our "days of grace" for counsel and

reflection are at an end. Immediate action is the only salvation. Using the words of Keen, "If the operation is not done within about twenty-four hours after the perforation, there is practically no hope." He prefers to operate during the second twelve hours, as he claims patients will have then recovered from the primary shock. Murphy has recently reported four cases successfully treated by incision and drainage all subsequent to the first twenty-four hours, but they should be looked upon as fortunate possibilities of operative work rather than indices for future guidance.

When it is known that the peritoneum is capable of absorbing 3 to 8 per cent. of the bodily weight of fluids in one hour, and that from a hole in the intestine there is being poured into this cavity a virulent poison, who can say just how many hours or days before a lethal dose is absorbed? From what we know of the physiology of the peritoneum, and the pathology secondary to intestinal perforation, immediate operation becomes imperative. If shock be present, it should be treated as in other conditions, but let the preparations for operation proceed.

DISCUSSION

Dr. I. N. Trent, of Muncie: I am very much interested in the paper, as I am always interested in any plan or method that offers anything that will benefit a condition that has heretofore been considered so hopeless as perforation in cases of typhoid ulceration. The statistics Dr. Noble gives of the percentages of perforations are greater than I have been in the habit of considering them. I have reported to this association in other years three hundred cases of typhoid fever with, as I believe, only two cases of perforation. There may have been others that I did not recognize. It is possible we do not recognize as many cases as there are. The essayist very nicely enumerates the symptoms and makes the matter plain, and I am inclined to think we have more cases of perforation than we usually credit ourselves with. He speaks of an exploratory incision. Exploratory incisions in some cases are to be commended, but I feel that in typhoid fever, where the system is depleted, we should be sure—if we can be sure—that

there is perforation before we open the abdomen. The advocates of operations for typhoid perforations have for their strongest point that the patient is going to die without the operation, and if by operating we can save a few cases we should do so—we should undertake the operations. It requires a great deal of judgment for an operator, when he has a patient suffering from typhoid fever, to subject him to an abdominal section; but, on the other hand, we must remember that he may be going to die anyhow, and I think our nerves should be equal to the task.

Dr. T. B. Eastman, Indianapolis: Dr. Noble's paper is along the line of pioneer work, and, like all papers of that sort, must be taken with a careful consideration of the facts. The operators of the country have been before the general practitioners advocating early operations in appendicitis. They have advocated surgical intervention in rupture during pregnancy, and now they are advocating surgical intervention in cases of perforation in typhoid. As Dr. Trent has said, it requires a great deal of careful judgment as to just what cases we are to operate on. I believe that in a certain number of cases the operation for perforation should be made. I take it that if we are to give our patient an anesthetic we will add very much to the gravity of the situation. Here is an operation I am quite satisfied can be done with local anesthesia. I believe it is an operation that should be done, and if we can save one case we have done well. The first opportunity I get I shall operate.

Dr. W. H. Link, Indianapolis: We must remember that in surgery in typhoid fever cases the last word has not yet been said. The general practitioner may be able to throw as much light on the subject as the surgeon. As to the probable success of an operation in a case of this kind, it will depend largely on when the perforation occurs. If it occurs early in the disease you will have some show of sucess if you operate, but if the perforation occurs after the third week, when the heart is almost exhausted and when the patient's strength is almost entirely gone, when he seems to be in a dying condition, in fact, an abdominal section

may simply be an antemortem postmortem, and offer no hope for the patient. I have seen one case of perforation in typhoid fever where the symptoms were so plain I could not be mistaken, and the counselor I called in agreed with me, and he was a man of experience in such cases. There were two reasons why I did not operate. One was that the patient would not let me, and the other was that I expected the man to die whether I opened his abdomen or not. So I treated him expectantly. Anything he took into his stomach he instantly vomited. I therefore withdrew milk and nourishment of any kind and even water for three days, giving him at the same time hypodermics of strychnia and morphia. He made a very unexpected recovery. That gave me some hope, and taught me that now and then one will recover. It is seldom that one recovers when you make an abdominal section. When the bowel is perforated by a gunshot wound or a typhoid ulcer, if the opening is very small the mucous membrane becomes immediately everted and forms a button which closes it up. I saw three perforations in a bowel caused by gunshot wounds, and the mucosa had so completely everted that it closed those three wounds. If that happens in the case of a typhoid ulcer it will prevent the poison from getting into the peritoneal cavity.

Dr. A. M. Hayden, of Evansville: Very often perforation takes place during the second or third week, when the patient is entirely exhausted, and under those circumstances it would be a very serious matter to open the abdominal cavity for any purpose whatever. Even if the patient recovered from the operation he would probably die from the fever. I have seen several cases of perforation of the intestines from typhoid fever, but I did not operate on them. I have had several recover. I believe had I operated on them they would have died. I was called in a hurry to one case in a neighboring town. When I got there I found a patient with a pulse of 160 and temperature 97. He was suffering extreme prostration, vomiting, and his condition was very serious. The doctor had advised an immediate operation, but I hesitated. I told him I did not believe the patient would recover if we operated, and he might get well without the operation. We

stopped giving him any kind of food or water. We washed out the stomach, gave the patient morphia, and he got well. I am satisfied if we had operated on that patient he would have died within twelve hours of the operation. Of course, in the earlier stages of the fever, when the patient has sufficient vitality left to stand the shock of the operation, we are sometimes justified in operating, and then the patient's chances of recovery are sometimes better without an operation.

Dr. E. J. McOscar, of Fort Wayne: This perforation is not going to hurt more than a perforation in any other place if it does not permit the escape into the peritoneal cavity of the poison that is causing the trouble. I am free to confess that in many cases where we have suspected perforation and the patient has recovered I have not believed it was there. We can not be sure any other way than by a postmortem examination. If everything has been shut off and there is no escape into the abdomen, there is no reason the perforation should not close itself. I saw one of these cases last year, and I was told by everyone who saw the case that the patient would not get well. His abdomen was opened, the abdominal cavity washed out, and he got well. The opening was closed up with sutures and he made a complete recovery.

Dr. L. G. Bowers, of Richmond: If you have ten cases of fever and nine get well, it is strange how hopeful the physician will be. If, on the other hand, you have ten cases and nine of them die, it is strange with what fear and trembling the physician will undertake such an operation. I can not see why, when the symptoms are such as to convince the physician that perforation is there, the abdomen should not be opened. If it is done quickly and the cavity drained and washed out there is some chance of the patient's recovery. My experience has been that at the end of the third week, when the patient begins to get a little extra feeding, perforation comes on. I think it is most likely to come on when the patient is convalescing. The patient by that time has gained in strength and will be able to stand the operation. I think we should be more conservative in feeding our patients.

Dr. Noble said very little about the treatment at the time of the operation. I think there is no abdominal case that should be more thoroughly washed out than cases of perforation. While there is difference of opinion about washing, such cases should be thoroughly washed out with a salt solution.

Dr. O. G. Pfaff, of Indianapolis: Until recently the profession has not taken up very seriously the question of operating in cases of typhoid ulcer. Statistics were presented at a meeting of the American Medical Association in Chicago about two years ago on this subject. The symptoms which we have been wont to look to as being those of perforation have been really symptoms of impending death. We get cases with symptoms of impending death stamped upon them, and we only save a small proportion of those cases. If an operation has been performed in over 200 cases, and the majority of them *in extremis,* and we still have over one-third of the number recover, I think it is a success. It is perfectly certain that if the diagnosis can be made early we ought to get our recovery rate to a point equal to the recovery rate in perforated appendicitis. Another consoling fact in this proposition is this—that, the diagnosis being not clear, we should operate on very strong suspicion. In practically all of these cases there have been almost no deaths from exploratory incisions. Many were done with anesthesia, but many others without anything more than local anesthesia. McDonald, of Albany, said that one rule in these cases is to get in quickly, and for the patient's sake to get out quickly!

Dr. T. B. Noble, of Indianapolis (closing): The reason we have not learned more about this condition is the fact that we have not sought it—have not gone after it. How many of you gentlemen, in all of your cases of typhoid fever, lay the abdomen bare and palpate the abdomen carefully every day and watch it carefully? How many of you sit by the bedside, jolly the patient a little, take the temperature and pulse and then hurry on to the next patient? How many of you keep every day, or twice a day, or three times a day, a temperature chart of your patients? It

is absolutely necessary that every case of typhoid fever be treated in this way; then, when you suspect the possibility of a typhoid perforation you will have this temperature chart to fall back on, and its disturbance will be evident. In all these cases where we think a perforation is possible the abdomen should be carefully anointed with an oil and carefully palpated with the fingers. If you will do this, and also slide the fingers up and down and palpate by continuous contact—not percussion contact—as your finger comes down over the inflamed area you will get the symptoms that should arouse your suspicion. If you will think of these cases, if you will dream of these possibilities, if you will carry the likelihood of this condition into all your cases, you are going to find more of them. Dr. Link made a comparison between the typhoid ulcer and the gunshot wound. I think his proposition is wrong. There is a great difference between the perforation of a bullet and the perforation of a typhoid ulcer. In one the pathology you have going on before the perforation takes away this bulb of mucous membrane he speaks of. You have an infiltrated area of mucosa, and when the perforation goes through the peritoneum you have a hole there, and you don't get the mucous membrane slipping into this opening through the peritoneum and plugging it up. However small this opening, it will remain. Gases are in there, and bacteria are there, and you will have this material passing through to set up your peritonitis. While this is the major reason for taking the ground that an immediate operation is necessary, another is that it is bad teaching to hold out the possibility of good results attendant upon procrastination. We must meet these cases as we meet appendicitis. That same proposition was presented two years ago when the subject of appendicitis was brought up. We were told to hold our hands and operate between attacks. That sacrificed many valuable lives. Now we take all these cases immediately because of our fear of the sequential pathology that follows, and we save these cases. If we will search these abdomens, if we will anticipate this condition, if we will think about and carry in our minds the possibility of these perforations and hunt for them and then operate immediately, we will decrease our mortality, even though

it is pretty large at present. There is a rule and that is, that no case—and I wish I could shout this into your ears so it would ring for all time—is so desperate as to offer no hope of recovery. That should be the rule. There may be an exception, but remember the rule, gentlemen, and fight for these cases. Even though your patients may be deep down in the valley of the shadow of death, you will save many of them if you follow this rule. There is a technique which gives us a right to make such a claim as this. We can meet these accidents, we can meet these complicated pathological processes that are in the abdomen, and bring out of this shadowy valley many, many patients.

I have refrained from taking up the subject of the operative work. I believe that is wholly out of place here. That is for the man who does the work; but we are all doctors here, we are all meeting cases of typhoid fever, and the picture that first comes to us is the one I wish to stamp upon your minds. It is the picture of nausea and vomiting, of abdominal rigidity, soreness and pain on pressure on the abdomen coming along somewhere in the course of typhoid infection. Look for that, and when you have it fear a typhoid perforation, and if you are not certain of your diagnosis get some counsel. It won't hurt you, and it will be good for your patient.

INTESTINAL OBSTRUCTION, WITH REPORT OF CASES.

BY L. G. BOWERS, M.D., OF RICHMOND.

Notwithstanding the mortality of obstruction of the bowels has been reduced by surgical interference from 90 to 50 per cent., it is yet one of the most fatal diseases which a physician or surgeon has to treat. The definition of intestinal obstruction is that condition which prevents the onward movement of the bowel contents. We may first divide obstruction into two classes, acute and chronic. The chronic obstructions are caused by neoplasms, carcinoma, etc. For ease of description we will divide the acute intestinal obstruction into three classes: Obstruction with strangulation, obstruction without strangulation, and obstruction due to paresis of the gut.

The first class, obstruction with strangulation, is well represented by the strangulated external hernias. It is also produced by bands and adhesions. In this class, besides having an obstruction of the onward flow of the contents of the gut, we have the gut and mesentery themselves endangered by the cutting off of their circulation, which interferes with their vitality and, as a consequence, the pathological changes produced may cause gangrene, sloughing, and fatal septic peritonitis.

The second class, obstruction to the contents of the intestine only, without interference with the circulation, is best illustrated by the passage of a large gall-stone which has lodged in and more or less completely obstructed its lumen. To this class also belongs stenosis of the gut, caused by tubercular, malignant and syphilitic ulcers. The former is usually located near the ileocecal valve and the latter in the rectum; and the common form of obstruction, fecal impaction.

The paralytic class, which is due to paralysis of a section, or of all of the intestine, is caused by inflammation of the peritoneum, by chemical and mechanical means, by hyperdistension of the gut by gas, and by embolism or thrombosis of the superior mesentery artery or vein. Paralysis by the chemical and mechanical means sometimes is brought about by too vigorous toilet of the peritoneum, or by the leaving of much raw surface after an operation, causing adhesions. Or, as before stated, rarely, by embolism or thrombosis due to some heart vegetation being carried to the superior mesentery vessels.

In general, the symptomatology of intestinal obstruction has more or less identity in all three classes. There is pain, nausea, vomiting and obstruction to the passage of feces and flatus, and, at a later period, distension. My observation has been that the nearer the obstruction is to the stomach, the earlier the vomiting. Also there may be one or two movements of the bowels which may be misleading to the physician. The nearer the obstruction is to the rectum, the earlier the obstruction to bowel movements, and the later the vomiting. Treves attached considerable diagnostic importance to fecal vomiting, which he says is an overflow of the intestinal contents above the obstruction, and to indican in the urine, which is constantly present in obstruction of the small gut.

I believe that we can get more accurate information from auscultation than by any other method of diagnosis. In the paretic cases everything will be dead to our ear, when placed to the abdomen. And in the other classes of cases we can make out not only obstructions, but also, and not infrequently, the exact location of the obstruction, which will indicate where to make the incision. In obstruction with strangulation there are decided symptoms: The patient who has been in perfect health is suddenly seized with violent pain in the abdomen. This is followed quickly with nausea, vomiting and collapse. There will be a frequent desire to go to stool. If not relieved the strangulated part will become paralyzed and distended, and can be mapped out under favorable conditions. Early there will be peristalsis above the obstruction. Below, the gut will be collapsed. Later, there will be a distension,

a rapid, feeble pulse, fecal vomiting with complete exhaustion. Upon the appearance of gangrene the pain greatly decreases and the collapse becomes greater until death closes the scene, when the condition has been left to nature.

In obstruction without strangulation the symptoms are not so pronounced as in the former class. The pain is usually intermittent; the vomiting may not appear early, or is not constant. The patient may pass some flatus. The pulse may be good and there is usually no increase in temperature. The patient does not have the feeling of impending danger. Early, the peristalsis and tenderness of the abdomen is not great. Later, there will be fecal vomiting, due to the overflow. Slowly, but surely, all the symptoms will become worse, unless the patient be relieved of the obstruction.

In the paralytic form the symptoms may be so mild that they pass off without any of the classical symptoms appearing. Again, there may be gangrene and death before the development of much peritonitis. In a case beginning suddenly with nausea, vomiting and pain, the passing of a large, bloody, foul stool, a crippled heart, and, upon auscultation, a dead abdomen, one may suspect thrombosis of the superior mesenteric vessels as the cause of the we can often positively locate the seat of obstruction.

It is sometimes difficult to determine in an obstruction whether we have obstruction with strangulation of the circulation or only obstruction to the flow of contents. As it is important as to treatment to differentiate early, we may here recapitulate by speaking of a few of the differential symptoms. Obstruction with strangulation of the circulation is always ushered in with a continuous sharp pain, with nausea and vomiting, great prostration, and, later, with stercoremia and complete obstruction to contents. The gut will be collapsed below the obstruction. Early, above the obstruction, we can outline the distended gut, with increased peristalsis. We can see on inspection an uneven distension of the abdomen at the point of pain, and by auscultation we can often positively locate the seat of obstruction.

In an obstruction to the onward movement of the contents only, we usually have an intermittent pain, with vomiting coming on

late, with less prostration, with a better pulse, no increase of temperature and with little or no uneven distension of the abdomen and not much increased peristalsis.

Intussusception is the most frequent cause of intestinal obstruction. The severity of the symptoms is in proportion to the severity of the strangulation of the mesentery. When the circulation is entirely cut off, gangrene is the inevitable consequence, followed by a fatal septic peritonitis. Most cases of intussusception are found in children below ten years of age, though they may occur at any age. The onset is sudden, pain at first intermittent, early vomiting may be absent or less urgent, depending as before stated on the location of the obstruction. There is a bloody mucous discharge from the rectum, with some tenesmus. On palpation we usually find a sausage shaped tumor in the left lower quadrant of the abdomen, but not constant as to location, and if low down it may be palpated through the rectum. Later on we have distension, increased vomiting, prostration, etc. Rarely, these cases slough and seemingly get well, but at a later period the patient may be endangered by stricture at the point of sloughing.

Obstruction caused by Meckel's diverticulum, until late years, has not been given very much attention. This diverticulum is more constant and causes internal obstruction more often than is generally supposed. We are indebted greatly to Dr. Moore, of Minneapolis, for a thorough description of this peculiar kind of obstruction. This diverticulum is a diverticulum of the ileum, and is a canal beginning in fetal life. A Meckel's diverticulum has a few times been mistaken for a vermiform appendix. Anatomically, the diverticulum is usually funnel shaped, its base being attached to some portion of the ileum, usually within eighteen inches of the ileocecal valve. Its distal end is small and cylindrical. Upon inspection this distal extremity may look like the end of an inverted glove finger. Occasionally the free end becomes attached. When it does become attached most commonly the attachment is near the umbilicus, and again it may appear as a hernia in the inguinal canal. When it adheres it forms a

band for a loop of gut to drop over to form an obstruction. The symptoms of obstruction from a Meckel's diverticulum are in general like those of obstruction from any other cause, but have some characteristics which may make diagnosis possible. Localized meteorism in the right lower quadrant of a young male patient, without fever, may be a slight indication of an obstruction from a Meckel's diverticulum.

The treatment of intestinal obstruction, whatever may be the cause, should, after a trial of medical treatment over a short period, be surgical. A mortality of 50 per cent. is appalling, and it can and should be decreased. It can only be improved by early surgical interference, not as a last resort. In this day of safety in opening the abdominal cavity, it is a good working rule to open the abdomen when we first suspect obstruction. Do not mask symptoms with the handy hypodermic syringe, which causes the patient to sleep away the golden opportunity. Many cases receive their death stroke while the physicians are waiting to make a diagnosis. What the patient desires is to get well. One had better operate early and save the patient without diagnosis, than to let him die with a diagnosis.

I will close by reporting two cases. Case 1. Male, age 45 years. I was called to see a case of inguinal hernia and after trying taxis under an anesthetic, we decided to operate. Upon opening the sack we found a knuckle of gut, anteriorly, and on the under side of this a projecting intestinal-like tissue which looked like the inverted end of a glove finger, which we thought was a Meckel's diverticulum. First we returned the gut and drew out this other piece of intestine and ligated it as far back as possible, cut it off and dropped it into the abdomen. This proved afterwards to be, as we had first supposed, a Meckel's diverticulum. This patient improved and was able to get up and go home about four weeks afterwards. Two months later I was called to see him and found that he again had symptoms of chronic internal obstruction. I advised him to go to the hospital, which he did. We opened his abdomen by a median incision and found that the diverticulum, which we had ligated and cut off had dropped in the abdomen about an inch below the internal ring and had attached itself there

again by adhesion, the other end of course being attached to the ileum. Over this a loop of gut had dropped and was strangulated, not completely, but enough to produce a violent colic and cause a stricture of the gut at the point of pressure. The gut was dilated very much above. This stricture was so small that you could hardly introduce a small slatepencil through the opening. I resected the gut and made an end to end anastomosis with a Murphy button. I also resected the diverticulum, and the patient made a good recovery.

The second case was a male child three years of age. I report this case to impress on you how early irreparable damage may be done to the bowel. This child was put to bed at 8 p. m. in its usual health. The father returned home at 10 p. m. when the child awakened and cried out from pain. The parents immediately got a physician who thought it had a colic due to indigestion, and gave it a sedative. It seemed to be resting easy at 3 a. m. and the physician returned home. At 7:30 a. m. they sent for another physician who found the child with a weak pulse, listless and distended abdomen. I saw it at 9 o'clock and we immediately moved it to the hospital and operated at 10 a. m., that is, twelve hours after the onset. Upon opening the abdomen we found it full of bloody serum. There was a slit in the mesentery, probably congenital, through which about eight or ten inches of the ascending colon and three feet of the small gut had passed. The gut was released easily. It was black and beyond repair. There was about four or five feet of the small gut damaged, which I believe was due to obstruction of the superior mesenteric vessels which were full of clotted blood. While we were only twenty minutes operating, the child was pulseless and we had to desist from any further procedure. It lived only three hours. As the first physician said that it vomited up all the sedative which he gave it, I naturally conclude that it probably had received its death stroke when the pain ceased at 3 a. m. It has not been uncommon in my experience for so great a destruction to take place in such a short period. This is another warning not to delay the necessary surgical operation.

DISCUSSION.

Dr. L. H. Dunning, Indianapolis: Our essayist has really given us a very graphic picture—brief, to be sure, and yet sufficient for ordinary use—of the symptoms of obstruction of the bowels. His division has been systematic and correct. I shall confine my remarks to the one point of mechanical obstruction of the bowels, which leads to death in a vast majority of instances. This mechanical obstruction of the bowels leads to death in about one hundred per cent. of the cases not operated upon; and I think the fatalities are about fifty per cent. when operated upon.

I think we need to study the diagnosis more carefully than any other feature. The author is correct in his statement that auscultation is one of the very best methods of arriving at quick diagnosis. At the beginning of strangulation and obstruction, peristalsis is largely increased. It does not require very close observation to discover this. We see it at once when we come to the bedside. If we see the patient early, within a few hours, we can in many instances trace the wave of vermicular action to the point of obstruction. This feature, however, of vermicular action very soon passes away. I have seen it pass away within the first twelve hours. Those cases in which the obstruction is very acute, the gangrene of the gut occurring within the first few hours, are attended by so great a degree of tympanitis that the diagnosis by auscultation is not possible in many instances after twelve hours. Another very marked symptom is localized pain in acute strangulation. This is not constant we must remember. The pain is localized usually at the point of strangulation. If it is present, and if we have a peristalsis running down to this point of pain, and have vomiting and other symptoms, we will have no trouble in making our diagnosis, especially if there is absence of movement of the bowels. Another symptom that is constant is vomiting, and this comes early, especially in cases of strangulated hernia, and in those cases in which we have openings somewhere in which large portions of the small intestines will run and become strangulated. I think we often underestimate the importance of the symptom of vomiting, especially if it is

accompanied by a distended stomach. Of course by the time we get a painful condition of the bowels we have stercoraceous vomiting, but that comes late, and if we wait until it comes it is often too late. I will say that of twenty cases I have operated on only one recovered that was operated on later than two and one-half days after the strangulation. Every case but one operated on longer than two and one-half days after the obstruction died. This has taught me a lesson I shall not forget, one which makes me exceedingly anxious to find out how long it has been since the first indications of obstruction began.

Dr. J. R. Eastman, Indianapolis: The essayist, and also Dr. Dunning, struck the key note when they said that in prompt diagnosis lies our only hope. It seems to me that upon this point the most emphasis must be laid. We must study these cases of obstruction of the bowels because many of them can be saved if they are operated upon before the abdomen is swelled as tight as a drum and the patient is in articulo mortis.

Palliative treatments of obstruction of the bowels are not of much use. I must confess that in the spastic sort of obstruction of the bowels morphine has its place. I do not think that rectal enemata will accomplish much if the obstruction is in the small part of the intestine. Simple obstruction will not produce ileus. No matter how thoroughly the bowels are washed out these symptoms may not be relieved. The simple fact that the intestinal tract does not empty itself does not indicate strangulation. I doubt whether it is possible in one per cent. of these cases to force water through the ileocecal valve by rectal injection. A gentleman wrote to me from Chicago that he had succeeded in doing this. He is a specialist in diseases of the nose and throat. He had been called to see a case of obstruction of the bowels, and diagnosed it as to its location in the small intestine. After repeated efforts to force water through the ileocecal valve without success he inverted the patient, or placed him in jack-knife position, gave him chloroform and injected a couple of gallons of water, all of which with a gush escaped from the patient's mouth. Such results will be very unusual; they won't occur very often.

Even in cases of spastic ileus or paralysis it may be found that the ileus was due to a mechanical lesion in the form of a calculus, some mechanical obstruction which can be mechanically relieved. Dr. Wynn has recently shown me in the Indianapolis Medical Society cases of obstruction of the bowel—postmortem cases—in which a complete and radical cure might have been obtained by prompt operation. I would not counsel operation in cases where we can not provide reasonable asepsis. It is not wise for a man to say that such cases must be operated on under the most primitive conditions; that is to say, in a livery stable with a jack-knife; but if reasonable asepsis can be provided, if a reasonably good surgeon can be procured, these cases should be operated upon as soon as the diagnosis is made.

Dr. A. B. Graham, of Indianapolis: I have been much interested and entertained by Dr. Bower's paper on intestinal obstruction. I believe that all surgeons present today recognize the fact that in order to effect a cure in any case of intestinal obstruction requires much surgical knowledge and skill.

As Dr. Bowers has told us, intestinal obstruction is attended by a terrible mortality. This high mortality is due to three causes:

First, we meet with cases of a very serious nature in which almost the entire small intestine is strangulated. In these cases the sympathetic plexus is injured and there occurs a rapidly fatal toxemia.

Second, the delay in operating. Statistics show that the successful cases are those in which an operation is performed in less than forty-eight hours after the onset of symptoms.

Third, the difficulty of recognizing the true condition in order to act intelligently. Many of our best surgeons have candidly confessed their inability to recognize the true cause of intestinal obstruction even after they had opened the abdomen and their patients had died without relief.

Dr. Bowers is certainly to be congratulated upon his ability to diagnose and locate the exact site of intestinal obstruction by the method of auscultation. I am frank in admitting that ausculta-

tion has proved to be of no value to me either in diagnosing or locating the site of an intestinal obstruction.

Further, Dr. Bowers tells us it is important to locate the exact site of obstruction, for by so doing the surgeon can decide as to where it will be best to make his incision. Gentlemen, there is but one place to make an incision in the radical operative treatment of intestinal obstruction, and that is in the median line. The opening of the abdomen in the median line gives the surgeon free access to every portion of the intestinal tract.

I agree fully with Dr. Bowers when he says, operate early in these cases and by so doing we can reduce our frightful mortality statistics. However, the doctor, in his consideration of the subject, has overlooked what I consider to be a most important point in the treatment of cases of intestinal obstruction. As a rule the surgeon does not see these cases early. The truth of the matter is, that when he is called to see a case he finds the patient with an abdomen markedly distended, suffering with stercoraceous vomiting, an almost imperceptible pulse—in fact presenting all the symptoms which clearly indicate that he can not live many hours without surgical interference of some kind. In such cases shall we make a median incision? It is true some surgeons advise such an incision. Shall we refuse to interfere surgically? Some surgeons would advocate such a procedure. Finally shall we attempt to save a life by a very simple surgical procedure? To open the abdomen in such cases and endeavor to remove the obstruction means a frightful mortality. To refuse to interfere surgically in some way I consider criminal.

I can not agree with Dr. Dunning's view that few cases of intestinal obstruction recover if operated on later than 48 hours after the onset of symptoms. My own very limited experience in the treatment of such cases and my close association for several years with Dr. George J. Cook in his very extensive experience in treating these cases has taught me one very valuable lesson —in fact a lesson so profitable that it has enabled me to save the lives of five out of six of my cases. Instead of making an incision in the median line and searching for the obstruction—instead of making a median line incision and making numerous

punctures of the distended loops of intestine (in other words performing the operation known as enterotomy)—I make an incision in the lower right quadrant—introduce one finger and draw out a loop of distended intestine as rapidly as possible. With a continuous or a few interrupted catgut sutures the distended gut is fastened to the parietal peritoneum and margins of the wound made by the incision. An opening large enough to drain freely the distended intestine is immediately made. In other words, the operation enterotomy is performed. A general anesthetic is not required, and in three out of the six cases a local anesthetic was not even employed.

Statistics show that the best results so far in these advanced cases have followed when the contents of the distended bowel have been evacuated. The operation enterotomy may appear to be a somewhat unsurgical procedure and not a very brilliant or complete operation; but still it can claim results which appear to indicate the direction in which our surgical measures should tend.

In conclusion I would say that the successful treatment of acute intestinal obstruction depends largely on two points: First, the question of operation; second, the question of the extent of interference that is indicated in any given case.

The operation must be according to the state of the patient. All cases are not equally fit for operation nor are all cases to be relieved by operation if undertaken early. In some the condition of the patient is good—in these make the median incision and endeavor to locate and remove the obstruction. In others a precisely opposite condition is present and any prolonged exploration is out of the question. In these cases perform enterotomy and I believe we can reduce our mortality statistics to less than 50 per cent.

Dr. Rosenthal, of Fort Wayne: Recently I had a case in Kokomo. The man had been operated on for hernia. The hernia had broken through again and had strangulated. I reached the patient at 2 o'clock in the morning. He told me his pain was gone and he had stopped vomiting. I insisted, however, on an immediate operation, for the very reason the pain had ceased and

there had been no passage from the bowels. Much to the surprise of the five surgeons present, we found five inches of absolutely gangrenous bowel.

In another case a woman had strangulated hernia for forty-eight hours. The pain had gone and the vomiting had ceased, and she said she was comfortable. We put her on a train and took her to the hospital. She walked into the hospital and to the operating-room, and yet when we operated we found some fifteen or eighteen inches of absolutely gangrenous bowel in the hernial sac. I remember another case where the strangulation had been reduced by mechanical means. When I reached the young man he was sitting up in the chair and he told me his pain was gone, but his bowels had not moved. We took him to the hospital. He walked into the hospital; his pulse was not unusual; in fact, it was rather slow. In this case there was a peculiar condition, in that on pressure in the internal ring I could get him to hiccough. In this case we found some four inches of gangrenous bowel in the hernia. In cases where the vomiting and pain has ceased and there is no indication that the strangulation has been relieved, there is need for prompt operation. A strangulated hernia should not be subjected to taxis except in a case where you have an individual with a bad heart. In these cases local anæsthesia should be used. I believe these cases of hernia should all be operated on whether the hernia is strangulated or not. No case of strangulated hernia should be allowed to go one minute longer than is necessary to get together the material for an operation.

Dr. W. D. Schwartz, of Portland: Dr. Eastman expressed doubt as to the veracity of the Chicago physician's statement. In order that you may not take my word for this case alone I will name the lady who was the patient. She was the wife of Samuel E. Munsey. She had trouble that was diagnosed as strangulated obstruction of the bowels. I injected between a gallon and a half and two gallons of water, and before I left the room she vomited more than a half gallon of water. This was in my presence. She had been trying to vomit, and bringing up from a teaspoon to a tablespoon of water before we gave her this injection.

Dr. Pantzer, of Indianapolis: Interesting points have been brought out. I wish briefly to emphasize the fact that we have no right to recur to either a surgical or a medical treatment of these cases until we have made our diagnosis. I wish further to call attention to a method of relieving some of these cases temporarily without surgical procedure. The method is extremely simple, and by mechanical laws would suggest itself. It will apply only to those cases of mechanical obstruction where we suppose the band holds the loop by a twist. During the past year I saw the case of a woman who had been in the throes of intestinal obstruction. In her past history there was evidence of repeated attacks of like character that had passed over. It was very evident that a loop was involved that at this time was giving rise to no evidence of inflammatory disease. I was able to reduce the trouble by the simple turning of the patient in bed, having her roll over and over. A woman in her condition was no fit subject for an operation then.

Dr. O. G. Pfaff, of Indianapolis: In many cases one meets an obstruction when the bowel is not at fault. Dr. Mackenzie, of London, was called on to operate on a physician who had obstruction for three days. The next day a calculus was passed from the urethra and the symptoms subsided. I have a case in mind in which I operated on a patient who had had every evidence of absolute obstruction for several days. There was distension, temperature of 103, pulse 140 and getting irregular. There was a small right omental hernia which had become strangulated; the gut was intact, and an immediate and prompt recovery occurred.

Dr. W. H. Link, of Indianapolis: I think this paper is timely, and that it is of interest to every practitioner. There is but one form of intestinal obstruction that medicine has any business attempting to overcome, and that is impaction. If any other form of intestinal obstruction occurs there is no use for anything but surgery. A large per cent. of them will die then unless operated on very soon after the appearance of the symptoms. I have had the misfortune to operate on ten cases of intestinal obstruction,

and in eight of those cases the obstruction had gone on from four to eight days, and every one of the eight died. In two of them I operated within six hours after the obstruction, and both these patients got well without trouble.

Dr. Rosenthal: Dr. Graham advocates the median incision for the location of the obstruction. I think the lateral incision is advisable.

Dr. Bowers (closing): I believe that in a case seen early, especially in the first twenty-four hours, you can elicit more information from auscultation than any other method. We should always operate early, and if we can make out the point of obstruction we can operate more rapidly. I emphasized in the paper, as did Dr. Dunning, that late auscultation is of no value. Later on, when we get the distention, we get more pain and the auscultation is not so valuable. In operating in late cases it is important to make a diagnosis between a case of strangulation in the mesentery and one where we have obstruction. In cases of obstruction without strangulation in the mesentery we can treat the cases late. In any case it is better to operate early, but if we can not operate early we should operate late if there is any hope whatever. I have operated on late cases where there was a recovery. As to always waiting to make a diagnosis, I don't think experience teaches that we can always make a diagnosis. If there is obstruction in the bowels that can not be relieved by ordinary means, an incision should be made. In an old person the obstruction is not discovered so soon as in a young one. I had one case of an old woman who had had an obstruction for eight days. The pain had never suggested to the physician that this was a femoral hernia. One of the greatest dangers to patients is waiting to make a diagnosis, and if the obstruction is high and we have one or two movements of the bowels we are apt to think the trouble is caused by indigestion.

PARETIC DEMENTIA.

BY ERNEST C. REYER, M.D., INDIANAPOLIS.

Paretic dementia is a subject of peculiar interest to the alienist, and of importance to the general practitioner and family physician. Of peculiar interest to the alienist because its pathology has been to a considerable degree unraveled, and the changes in the finer structures of the central nervous system have been found to explain in a measure, both the mental and physical phenomena.

Of importance to the general practitioner because it may frequently be diagnosed even in its early stages, by the presence of well-known physical signs; its dire prognosis forseen, and very serious consequences at times averted, and because it is liable to atack persons in the better walks of life, well known in the community, men who have probably no inherited weakness, whose work has been crowned with success and gives promise of still better things; professional and business men, authors and actors, preachers and physicians.

Moreover there seems but little doubt that among the population of the cities at least, this disease is upon the increase.

Paretic dementia may be defined as a progressive degenerative disease of the central nervous system characterized usually by mental enfeeblement with delusions frequently of grandeur, and physically by motor, reflex, and speech defects.

If we consider broadly that hereditary taint represents one-half of the ætiological factors concerned in the production of insanity, and stress and strain, disease, worry, etc., the other half, it will be found that paretic dementia derives its ætiological factors as a rule from the second class of causes.

It is a half brother of tabes dorsalis, and in most instances is to be regarded as an acquired disease; yet even here we can hardly

doubt that the subject of hereditary neuropathic taint falls a more ready victim to the causative factors than does he of sounder and more stable organization.

Syphilis is no doubt the most frequent single factor. Some investigators have gone as far as to ascribe every case to a former specific infection. Yet its relationship to syphilis has not been shown to be so nearly constant as in the case of tabes. It seems safe to assert that in about half the cases, syphilitic infection has been the determining factor.

As in the case of locomotor ataxia we do not consider it among the manifestations of syphilis, however. Syphilis of the central nervous system is really a disease of the vessels and membranes, and injures nerve tissue only secondarily, by pressure, by exudation, by occlusion of vessels, gummatous deposit, membranous thickening, etc., while in tabes and paretic dementia, early if not primarily the neurons themselves are the seat of retrograde changes, which may occur in the absence of gross syphilitic lesions. It may be that in the syphilitic toxines we must look for the agency whose prolonged effect saps the vitality of cells, and leads to the development of the so-called para-syphilitic affections.

Other causes are of undoubted potency; exhausting diseases, alcoholism, mental anxiety, overwork and high tension, irregular hours and excesses of various kinds, physical and mental shock, each come in for a share of the blame in a proportion of cases.

The onset of the disease is usually in the active period of adult life—between 30 and 45 years—and in males more frequent. The proportion in the United States being probably 8 or 10 men to 1 woman. Its development is usually slow and it has been found convenient to divide the course of the disease, as in ataxia, into three stages:

First. The prodromal period.

Second. The period of active mental disturbances.

Third. The period of dementia and general physical decrepitude.

As the purpose of this paper is to lay emphasis upon certain diagnostic features, rather than to give a description of the course

of the disease with its great variations or types, I will refer to these three periods of the disease rather from the diagnostic standpoint.

Unless the practitioner be on his guard the disease may be readily overlooked. Within the year a patient was sent home from the city hospital of this city with a diagnosis of paretic dementia. At the request of his wife an insanity commission was held, and he was declared of sound mind. Within a month he became unmanageable. In making the diagnosis the cardinal point to bear in mind is that the patient presents a mental change associated with certain physical signs.

Frequently the so-called prodromal period is so insidious in its development as to lack any striking mental or physical phenomena. The little lapses of memory, or errors in judgment, with perhaps disordered sleep, headache and irritability are readily ascribed to overwork, a disordered liver or at most to neurasthenia.

In this stage a tentative diagnosis may, however, be made at times. Any mental change, any change in temperament, whether exaltation or depression, any alteration of character in a man during the period of middle adult life, should arouse the suspicion of beginning paresis and lead to a search for physical signs as well as mental symptoms.

These signs, appearing early at times, are mainly motor, speech and reflex disturbances.

A fine or coarse jerky tremor about the lips and tongue may appear at the beginning of an effort to speak, or to innervate the facial muscles. Of these I consider the coarse more diagnostic. A peculiar articulation, tremulous, scanning, stumbling, changing at times the quality of the voice, giving it a sort of drawl or even sing-song character, associated with difficulty of enunciation notably of the linguals and labials is noted.

The patient may be able to give expression to his own thoughts without showing a speech defect, and yet show a marked stumbling when required to repeat test phrases rich in labials and linguals. A little excitement may greatly increase the disability; or, in the early stages overcome it. The handwriting may be as characteristic as the speech.

The patellar reflexes are altered in most all cases. More frequently they are exaggerated, almost warranting the term spastic. In others again they are lost—so-called atactic cases.

Probably the most important of all physical signs is the Argyll-Robertson pupil—reflex iridoplegia. In this condition the pupil fails to contract when exposed to light, but does contract when the patient converges for near vision. The optic and third intact, but association neurons in showing the ganglion probably at fault.

In 90 per cent. of cases Argyll-Robertson pupil the patient is suffering from tabes dorsalis or from general paresis.

Unequal or irregular pupils are suspicious, but not so diagnostic.

If a case were presented to me presenting a mental alienation, or a marked change in his manner of feeling and acting, and I found the Argyll-Robertson pupil, I should make the diagnosis almost without qualification.

I should consider the peculiar speech defects almost as diagnostic as the Argyll-Robertson pupil. The tremor and the patellar changes, while helpful in establishing the diagnosis, yet are not so significant, being more often present in neuroses.

The mental symptoms are rarely diagnostic at first. In some cases there is depression, amounting almost to melancholia; in others there is even now an expansive state. There may be no actual delusion, and yet what might be called a delusive state, a delusive manner of seeing or interpreting things. I recall a prosperous wholesale merchant who was approached at different times by a life insurance agent with negative result. After an interval of about a year the agent again called upon him. He was received almost effusively; the man said he was just in shape for an additional $10,000 policy, the application was written and the man brought to my office. He answered all questions flawlessly, but there was a suspicious tremor about the mouth corners at times. On my making a friendly inquiry about his business, he launched into a disquisition about the character and volume of their stock, which would have done for an advertisement. He wrote a fair signature to his answers, but when given a piece of paper and asked to write a few words upon dictation he made almost a complete failure. The man was fully able to carry the insurance asked for; his

firm was carrying a large stock of goods and was prosperous, and yet his manner of feeling and acting was already a delusive one, and if the intentions of his partner to take a vacation trip to Europe and leave the entire care of a large business in the hands of this man for some months had been carried out very grave results might have ensued.

Neurasthenia, the lesions of chronic alcoholic intoxication and the cerebral lesions of syphilis are most apt to simulate the disease notably in its initial stage.

As regards the physical signs, chronic alcoholism is usually marked by changes in skin and mucous membranes, a history of catarrhal condition of stomach, etc. The peculiar defect in speech and writing does not appear and the Argyll-Robertson pupil is rare.

Cerebral syphilis with its endarteritis, chronic meningitis, encephalitis, etc., etc., cannot at all times be excluded, and if any doubt exist, the patient should be given the benefit of the doubt in treatment, and final judgment be reserved.

Mentally depressed cases may resemble neurasthenia. The presence of the Argyll-Robertson pupil would settle the question. Otherwise the sum of the mental and physical signs must serve for a tentative diagnosis. When well advanced the manifestations of the disease are so marked that the diagnosis is readily made. Physical mental crises, a violent furious mania, or an apoplectiform attack may usher in the second stage.

Delusions are marked by great exaggeration. Shiploads of gold, feelings of undue well-being amounting to actual happiness, a smile that is child-like and bland; or exaggerated depressing delusions without real mental pain, general tremor, increased speech defects, awkward gait and general muscular enfeeblement. Diminished sensibility to pain, grinding of teeth, bolting of food, untidiness, uncleanliness, mark the gradual approach to complete mental and physical disintegration.

As regards the pathology, I will be brief. Whether we consider the disease primarily a slow meningo-encephalitis, or whether we believe that the inflammatory and thickening processes are secondary to the degeneration of the neurons and resulting choking

and stasis and intoxication of lymph and venous channels, we observe both conditions are found early. On the part of the cells, swelling, chromatolysis, fatty degeneration, vacuolization, pigmentation and finally atrophy of the cell body, involving and at times preceded by similar changes in the axis cylinder occur.

These changes involve the entire cortex, but may be more pronounced in the frontal and parietal regions. No part of the brain is exempt and the cord is involved in about 10 per cent. of the cases.

The vessels at first show hyperæmia and stasis, increase of nuclei, exudation into the lymph spaces; there is proliferation of neuroglia to the extent finally of a diffuse sclerosis. Retraction occurs, the brain becomes smaller and harder, vacuoles may appear here and there. The membranes are thickened and the cerebrospinal fluid is increased and fills in the spaces between the shrunken convolutions.

In making the prognosis, which, of course is bad, it must be borne in mind that some cases are rather remittent in character.

Symptoms may be far in advance of the actual destruction of tissue. The function of nerve tissues is often disturbed or lost as we all know in so-called neuroses with no palpable lesion, and so in tabes and in paretic dementia the symptoms may be out of proportion to say the least in the pathological change, and considerable improvement occur. This is especially liable to be the case for a time after any crisis like an apoplectiform attack or an acute maniacal outburst. Recovery from these crises is the rule. The hemiplegia is apt to be evanescent or the mania is apt to give way to comparative mental calm and partial restoration of reason.

But ultimately the disease progresses and its termination in dementia and death can scarcely be averted.

As regards treatment it must be borne in mind that the prognosis being so grave if the diagnosis be correct, the patient should be given the benefit of any doubt. Notably does this apply to a course of antisyphilitic treatment.

Of course the patient even in the early stage should not occupy any position of grave responsibility, and in most cases is better off if he do but a little light physical work.

The excitement of travel is rarely beneficial, though a removal to another climate for prolonged residence may have a beneficial effect upon nutrition and bring about the hoped for remission. Beyond that little can be hoped for except that by tonics, good nutrition, carefully regulated habits, etc., more or less prolonged remission may occur.

In the latter stages of course it is a mere question of nursing, the prevention of accidents, etc.

DISCUSSION.

Dr. A. J. McCracken, of Indianapolis: When we take into consideration the fact that the disease has been recognized less than three-fourths of a century it is especially important that we familiarize ourselves with it. In the diagnosis, we first notice an affection of the voice and the handwriting. Once heard one will never forget the peculiar tone of voice, almost impossible to describe, but simulating that of a drunken man. Another symptom noticed early is the fibrilary tremor about the nose and the corners of the mouth. The intellectual symptoms are the ones which require the most study on the part of the general practitioner. There is a state of exaltation, and often accompanying this they have delusions of grandeur, as of great wealth. They are in a state of more than well-being—a state of happiness. Then it is the friends of the patient and the members of his family will want to know what steps they shall take to look after the patient and his business. The number of years paretics live is two or three and occasionally five. It has been my privilege to observe two cases, one in which the diagnosis was made seven years ago. The symptoms were well pronounced at that time but the patient apparently recovered from them and has had a period of rest for seven years and is still in the period of rest, although there is a gradual deterioration of the mental and physical powers. In another case in which the diagnosis was made eleven years ago, the symptoms being well marked and continuing for a long time, the patient has now been in a state of rest for eleven years and gets about fairly well, goes to his meals and takes plenty of fresh air and exercise, but does not take any interest in business or financial affairs.

Dr. W. B. Fletcher, of Indianapolis: I was very glad to hear the paper. In fact I couldn't have written a better one myself. Dr. Reyer covered the subject almost entirely with the exception of one thing. I attend medical societies, as a rule, for the purpose of learning how to cure my patients, and like many text-books written in the last twenty years they give very fine descriptions of cases but never tell how to cure them.

I have had, I think, a record of some two hundred cases of general paresis, or softening of the brain as they call it as a rule in the country, and I have known of two cases, as Doctor McCracken just stated, that have had a period of three or four years without having the worst symptoms of paretic dementia. They have had in other years spells of apparent freedom from hallucinations and delusions and proceeded with their ordinary business, but that is all. This is called the American disease because it is almost peculiar to America. It was supposed to originate in this country because of our intensity of action and thought, but I think it is a general expression of syphilis in the American people more than anything else.

I have observed patients go on for some time before anything is discernable. The commercial traveler is more apt to have it than any one else. He gets a salary and a percentage on his work and he works hard and leads a rather wild life and gets to "going it with the boys," and then he draws checks for money he hasn't in the bank and really thinks he has. He begins to get restless. Night and day he is on the go. The people think it is only energy, but it is disease. We can call it softening of the brain if we hold the idea that he has a soft fluid between the brain and the calvarium, but the brain is in fact more dense and weighs more than the ordinary brain in proportion to its size. He has delusions of wealth and thinks he is able to buy everything in the country. His hearing and eyesight are changed to a certain extent, and I believe whenever we find the true pathology of general paresis or paretic dementia that we will find it somewhere about the solar plexus. I think we will find that the great controlling center of the blood vessels is the seat of the disease. That it comes from syphilis most often is undoubtedly true, but not always.

About 50 per cent. of all the cases treated at the insane hospitals, as Dr. Reyer says, might be found to have syphilis. So that syphilis doesn't show a great deal of effect. We do not know much about the actual cause of general paresis and we know much less about the treatment. Almost all have died within two years. I tell them I can not cure them. They are the most difficult cases to take care of under the sun. They have a reasoning form of insanity that makes a jury believe they are not insane at all up to certain stages, no matter what follies they commit. I have seen a case in this city where two eminent pathologists pronounced him insane and a jury composed of four or five gamblers and a clergyman said he wasn't insane at all, and the judge, of course, knew all about insanity. But time proves the diagnosis to the most conceited and ignorant.

Dr. H. J. Hall, of Franklin: I think if we look back into the history of the cases we have had we will find that alcoholism has a larger influence in causing this disease than we realize at first, because of the deceitful or gradual influence it has upon the nervous system. Even before that stage that we generally speak of as alcoholism we will find there is great damage done to the nervous system—a hardening process. And we know what influence alcohol has upon the brain and upon the general nutrition of the body. This disease comes upon the best class of patients we have, good business men who are so energetic in their business and feel that they must carry on their work and so often resort to alcohol to tide them over and stimulate them for a short time, and they use it more than they realize.

Dr. A. E. Sterne, of Indianapolis: In the very beginning it is frequently difficult to differentiate between what is commonly called nervous exhaustion and beginning paretic dementia. I think these two conditions are closely allied in many of their aspects. In nervous exhaustion, so-called, there is a debility of the nerve cell itself. Very many cases of neurasthenia show a distinct mental phase; in fact, all of them do; and very frequently indeed do we find a similarity in the condition to that of paretic dementia. Paretic dementia at its very start consists of an alteration

of the blood vessel walls with a consequent impairment of the nutrition of the cell which may pass to such a point as secondarily will bring about starvation of that nerve cell. The symptoms will be according to the function of that portion of the brain where the changes occur. These are usually in the capillary system of the cortex. If in the posterior portion of the brain the changes will be in the visual field; if in the parietal region the symptoms will be motor, tremors, etc. It is only when the process extends to the frontal region that we have the characteristic mental symptoms which stigmatize the person as a paretic dement.

Dr. Fletcher has correctly said that the proportion of paralytic dements to the number of syphilitics is small, but the percentage of paretics with a history of syphilis is seventy-five, even ninety. This shows the importance of syphilis as a cause of the disease. In locomotor ataxia we have the some condition except that the lower or spinal axis is involved. In paresis the upper end, the cerebro-spinal axis, is involved. They may be associated together. In fully 50 per cent. do you find this association. Syphilis is known to play an important part, also alcohol, as Dr. Hall has said, because of the effect on the blood vessels. But we must not overlook the chief and main fact, namely, the strife and stress of life at the present time which makes a man live beyond his possible power of cellular nerve force. That is the chief factor, I think, at the base of the disease.

Dr. Fletcher: I want to answer a question that my friend Dr. Hall has raised. I think I have known of but one case of paretic dementia who was not a user of alcohol as a stimulant to his work. Whether it is a primary cause or not I can not say, but all of them with one exception used alcohol as a stimulant to their over-taxed energies.

Dr. E. C. Reyer: I wish to thank the gentlemen for their liberal discussion, notably Dr. Fletcher, my old preceptor. It is a fact that in looking after the etiological factors in this disease we notice a marked discrepancy between the large number of syphilitics and the small number of tabetics and paretics. So also as regards alcoholism. If all the people who indulge in alcohol, as

Dr. Hall puts it, were to suffer from this disease, the race would soon become extinct.

I am one of those who do not believe that paresis is entirely specific or parasyphilitic disease. Even locomotor ataxia occurs in a small number of patients who have not had syphilis. As regards the primary origin of the disease, nobody knows. It is claimed by one the blood vessels; it is claimed by others it begins in the neurons. We do know that toxic elements have selective actions; that strychnia will manifest itself mainly by motor disturbances, etc. Yet that it can be strictly limited to any one system or any one kind of cell is surely not the case. The toxic element acts upon all the tissues and notably upon nerve tissue and produces, I believe, degenerate processes. If you get a poison which will inflame and cause proliferation in neuroglia and fibrous tissue that same poison may also attack the neuron and the cell and its prolongations, the dendrons and neurons, and the blood vessels, also. It varies as to which one is primarily and most prominently attacked.

REPORT OF COMMITTEE ON STATE MEDICINE AND HYGIENE.

J. N. HURTY, M. D., SECRETARY OF STATE BOARD OF HEALTH, INDIANAPOLIS, CHAIRMAN.

State Medicine: Decisions Under the Medical Law.—During the past year there were instituted twenty prosecutions in different counties for practicing medicine without a license. About one-third of them have resulted in convictions. About one-half are still on the dockets and remain to be tried. The leading case this year was the prosecution and conviction of Laura S. Funk, a Christian Scientist, in the Marion Criminal Court. Next in importance, probably, was the conviction of Dr. A. D. Williams, a traveling specialist from St. Louis, who was prosecuted at Bedford. The license of Daniel D. Weiser was canceled. Early in the year a final decision was obtained, establishing that the Board had a right to investigate the character of the diplomas held by Osteopaths engaged in the practice when the acts of 1901 went into force. In the case of Parks v. State, in 150 Ind. 211, the Supreme Court decided most explicitly:

1. That the medical law, as amended in 1901, was constitutional.

2. That an indictment or affidavit in the general language of the statute was sufficient.

3. A magnetic healer is within the inhibition of the law and must be convicted if he has no license.

A licensed physician who changes his residence from one county in this State to another must procure a new license from the clerk of the county to which he has removed, or it will be unlawful for him to practice. —Mayfield v. Nale, 26 Ind. App. 240.

Dental.—With the exception of five convictions for practicing without licenses, no decisions have been given affecting dental medicine.

Pharmaceutical.—Forty registered and forty-seven assistant registered pharmacists have been enrolled within the year. There were nine prosecutions for practicing without license. All pleaded guilty except one, and he filed complaint against himself, defended, and was fined. No Supreme Court decisions.

Health.—The Supreme Court, January 28, 1904, decided the amendments made to the health law in 1899 to be unconstitutional. The case was entitled Claude T. Hendershot v. State, ex rel. James B. Bennett, and came from the Perry County Circuit Court. The lower court decided the law unconstitutional because of the proviso requiring that health

officers should be graduates of a medical college recognized by the State Medical Board of Registration and Examination. The Supreme Court did not sustain this, but, discovering that the title of the amendment omitted one whole sentence of the title of the amended act, decided that therefore it was unconstitutional. The omission was a mistake made by an engrossing clerk, and although seemingly trivial, still it is plain by the constitution that the highest court acted wisely and well. It was under these amendments that correct mortality statistics were being collected to the honor and credit of the State and the medical profession. This decision but makes the opportunity for the physicians of the State to secure from the next Legislature a health law that will be up to date in every particular.

Hygiene.—Two remarkable conventions directly relating to hygiene were held during the year. The first, "Maryland Tuberculosis Exposition," was held in Baltimore during the week beginning January 25, 1904. There was an exposition, elaborate and specific, covering an area of 2,000 square feet of floor space, showing literature, pathology, statistics and sanatorium treatment. A lecture was delivered each day in McCoy Hall of Johns Hopkins University. The exposition was opened with speeches by Dr. William Thayer, Governor Warfield and Dr. Osler. The lecturers and their subjects were: Frederick L. Hoffman, "The Statistical Laws of Tuberculosis;" Dr. L. F. Flick, "House Infection of Tuberculosis;" Dr. Mazyck Ravenel, "Bovine Tuberculosis a Factor in the Causation of Human Tuberculosis;" Dr. D. E. Salmon, "Some Observations on the Tuberculosis of Animals;" Dr. S. A. Knopf, "Pulmonary Consumption and the Possibility of Its Eradication Through the Combined Efforts of a Wise Government, Well-trained Physicians and an Intelligent People;" Dr. J. Geo. Adami, "On Facts, Half Truths and the Truth, with Special Reference to the Subject of Tuberculosis." The uplift of this exposition has been felt throughout the United States.

The second convention was the First International Congress of School Hygiene, held at Nuremberg, Germany. One thousand two hundred forty-seven delegates were present from twenty counties. Eleven delegates were inscribed from North America. Many phases of school hygiene were reported upon by committees and then discussed. The scientific program was opened by an address by Prof. Herman Cohn, of Breslau. Eight principal addresses were delivered and 153 communications presented. Norway was the only country which could report that its every school was medically inspected.

Sewage Disposal.—The very great economic and sanitary importance of sanitary sewage disposal is gradually filtering into the public mind. Rochester and Bedford are two cities of this State which have recognized the sin of polluting streams with city sewage, and have constructed septic tanks for destruction purposes. The Logansport, Richmond and Evansville Insane Hospitals, also the Boys' School at Plainfield, are now provided with adequate sewage disposal plants. Dr. Joseph Rogers, at Logansport, was the first Superintendent of Insane Hospitals in Indiana

to adopt and have constructed a method of disposal and utilization of sewage. At the Evansville Hospital a chemical and sand filtration method is practiced, and at Richmond the septic tank and sand filtration was adopted. At Rome City all sewage from the island in Sylvan Lake is disposed of by the septic tank and sand filtration method. At the latter place large concourses of people gather during the summer to attend lectures and receive instruction in the summer school. Heretofore the gathering of 5,000 to 10,000 people on the island had produced unbearable conditions, and the management of the Grand Rapids & Indiana Railroad, recognizing that its health resort would be changed into a disease resort if the crowds and their filth were not effectually separated, put in the disposal plant.

Indianapolis still heads the list as the greatest polluter and poisoner of streams in the State, and White River is the most abused stream. This river receives its first load of sewage from Muncie, and there, too, strawboard refuse and slaughter house offal are first added. At Yorktown, a few miles below Muncie, strawboard refuse is again introduced, and then comes Anderson, which contributes sewage, strawboard refuse, slaughter house offal and tinplate pickle. At Noblesville the poor stream is made to bear more sewage, street drainage and slaughter house offal. At Broad Ripple, near Indianapolis, all the above accumulated filth is conserved by a dam and furnishes a lake to adorn a park. Finally, the polluted water appears at Indianapolis, and there receives a sewer charge so foul and in such quantities as to make it appear by comparison at first of crystal purity.

Below Indianapolis the waters, surcharged with rottenness, black and reeking, devoid of all life except a few boys and men whose blunted senses permit them to paddle upon or wade in the same, proceeds sluggishly onward, seemingly disgusted and ashamed. It is one of the duties of the physicians of the State to teach the people that all sewage must be sanitarially disposed of by some of the methods which have been so thoroughly worked out by sanitary science. And the people must also learn that as it is a dirty bird that befouls its own nest, so also is that people dirty which befouls the streams.

Disinfection of Excreta.—As our statistical, clinical and bacteriological knowledge increases of the diarrhœal diseases, it more and more plainly appears that complete disinfection of diarrhœal stools must be practiced, and that physicians are derelict who do not so advise. It was a surprise that the dysentery bacillus (shiga bacillus) should turn out to be the cause of summer diarrhœa of children. This organism was proven to be the cause of epidemic dysentery (not, of course, amebic dysentery) and proven to be the cause of adult dysentery, but the medical world was indeed surprised to discover that the ordinary summer infantile diarrhœa belonged to the same group of cases as adult dysentery. The treatment of the disease will be very little changed by the discovery, but the light thrown upon prevention is very bright.

Deaths.—For the year ending December 31, 1903, there were reported

33,892 deaths, which is 137 fewer than in the preceding year. The rate for the year was 13.4 per 1,000, as against 13.5 in the preceding year. The highest death rate occurred in Marion county (17.9), and the lowest in Jasper (8.3). Of the total deaths, 16,286 were females and 17,606 males, and 22.1 per cent. of the total deaths were of infants under 1 year of age; 23.2 per cent. were under 5 years, and 26 per cent. were 65 and over.

The table below gives the mortality status for 1903 of certain diseases. The number of deaths, State rate, city rate and country rate are given for the year named, and the average rate for four years is added for comparison:

1903. DISEASES.	No Deaths.	State rate per 100,000.	City rate per 100,000.	Country rate per 100,000.	Average rate four years per 100,000.
Pulmonary tuberculosis	3,864	153.5	181.7	130.6	151.3
Other forms of tuberculosis	541	21.4	26.2	16.6	18.1
Typhoid fever	1,013	40.2	45.6	34.3	47.2
Diphtheria	429	17.0	26.2	12.4	13.4
Scarlet fever	164	6.5	7.7	6.7	5.9
Measles	73	2.9	3.9	3.1	3.8
Whooping-cough	149	5.9	8.0	5.0	7.7
Pneumonia	2,660	105.7	153.3	96.4	105.8
Diarrhœal diseases	1,449	57.5	69.5	47.5	70.0
Cerebral spinal meningitis	341	13.5	15.4	11.6	11.4
Influenza	348	13.8	16.2	14.1	18.5
Puerperal fever	161	6.3	8.0	4.2	6.9
Cancer	1,217	48.2	57.1	39.4	43.4
Violence	1,917	76.1	85.8	55.0	68.7

CERTAIN DISEASES.

Smallpox.—During the year 1903 smallpox invaded every county in the State, 11,009 cases being reported, with 195 deaths. It seems fair to say that the number was twice this, because it has been discovered that in many instances the disease prevailed for one or two months before it was recognized whole communities had it, and not a case reported. Even typical and severe cases have been passed as chickenpox. Porogo, elephant itch, cuban itch, Porto Rico scratches, blood pimples and stomach eruption are some of the queer names which have been persistently applied to unmistakable smallpox cases. In April, just ended, 260 cases were reported in twenty-nine counties, with six deaths. The following table, by months, shows cases and deaths for the year ending April 30, 1904;

MONTHS.	Cases.	Deaths.	Counties Invaded.
May	570	10	59
June	252	4	49
July	104	4	22
August	129	12	24
September	68	2	16
October	324	1	31
November	324	1	33
December	523	2	40
January	480	8	38
February	408	5	34
March	231	3	41
April	260	6	29
Total	3,673	58	416

The table shows the disease has been epidemic for the year. Because of this several cities and counties and a few towns have established pest-houses and created a regular smallpox service.

Diphtheria.—Four hundred twenty-nine diphtheria deaths were reported in 1903. This is forty-four more than in the preceding year, yet below the average (461) for the last four years. Despite quarantine the cases are no fewer than formerly, a decrease in deaths only appearing. Undoubtedly the now general use of antitoxin is the reason for this, and certain it is the case rate would also diminish, as elsewhere set forth, if immunizing was more general.

Scarlet Fever.—One hundred sixty-four deaths—fourteen more than in the preceding year. This disease is now only a little more destructive than whooping cough, which caused 149 deaths. McCullum insists that scarlet fever will not abate materially until physicians more frequently detect mild cases and report them for quarantine. In one instance in this State last year, while examining school children, one little girl was found with a temperature of 101.2, flushed face, red patches on mucous surfaces of throat and the papillæ of tongue red and slightly raised. Suspecting scarlet fever, the child was taken home and there her little brother, two years old, had an attack which was unmistakably scarlet fever. The little girl desquamated afterward, and other cases soon appeared in the school. The physician attending the clear case was derelict in his duties as a physician, as a citizen, and was a violator of the law, for not reporting the first case, thus bringing quarantine for the protection of other children.

Diarrhœal Diseases.—There were 2,071 deaths, against 2,447 in 1902. Of these 1,449 and 1,779, respectively, were under five years of age. As the diarrhœal diseases (excepting mechanical forms) are all due to a specific organism, the dysentery (shiga) bacillus, proliferating probably only in the human intestine, it follows that the discharges in all cases

of diarrhœa should be carefully disinfected, and, of course, able and conscientious practitioners will not neglect to recommend that this be done.

Pneumonia.—There were 2,194 deaths, against 2,349 in 1902. In December, January, February and March, just past, there was a marked increase in this malady. Blustering, cold, damp weather has been assigned as the cause. However, investigation shows that in the same months of 1899 and 1900 pneumonia was quite as prevalent, but the weather was mild in comparison. Certainly bad weather was not the cause in the first period. Further study discloses the fact that in both periods influenza, measles, coughs and colds were unusually prevalent, and hence the suggestion that very likely the unusual amount of pneumonia was a sequel to these maladies. Before the weather is decided to be a direct cause we must consider the fact that at the tuberculosis hospitals pneumonia patients are found to recover rapidly by outdoor treatment the same as is used for tuberculosis. Dr. Millett, of the Tuberculosis Sanatorium at East Bridgewater, Mass., reports most satisfactory results from outdoor treatment. It is true that at all times, whether unusually prevalent or not, pneumonia generally attacks the extremes of life.

The attention of the profession is called to the fact that too rarely measures are recommended against the distribution of the infective sputum from pneumonic patients. Sputum from all pneumococcal affections of the respiratory tract, and especially pneumonic sputum, should always be destroyed. It is a violation of the first principles of preventive medicine to permit pneumonic, tuberculosis or catarrhal sputum to dry. Acute lobar pneumonia is a pneumococcus disease, and if it were possible to destroy all pneumococci pneumonia would disappear. Your committee strongly urges all practitioners to direct the thorough disinfection or fire-destruction of all sputum, whether it be pneumonic, tubercular or catarrhal.

Tuberculosis.—Pulmonary, 3,864 deaths; other forms, 541; total, 4,405. In the preceding year, pulmonary, 3,900 deaths; other forms, 507; total, 4,407. There is much satisfaction in not having to record an increase, but it will soon be a disgrace to the medical profession if a decrease does not appear. It is unquestionably the duty of the profession to persistently bring this matter before the Legislature and make sure that the State does its part in the combat against this awful plague, which makes widows and orphans by the thousands and which annually breaks up hundreds of homes, besides being no inconsiderable factor in the production of criminals, paupers and insane. In 1903 consumption destroyed 1,714 males and 2,691 females, and 59.1 per cent. of these, or 2,604, were in the prime of life, namely, 15 to 40.

To show the rate status of tuberculosis, a table is here given showing the rate per 100,000 of deaths in cities and country for the last four years.

TUBERCULOSIS—PULMONARY.

CITY AND COUNTRY—RATES PER 100,000 FOR FOUR YEARS.

1900.		1901.		1902.		1903.	
Cities.	Country.	Cities.	Country.	Cities.	Country.	Cities.	Country.
166.8	118.6	182.3	144.5	173.1	135.1	181.7	130.6

School Hygiene.—The committee calls particular attention to the subject of school hygiene, because—

(1) The epidemic transmissible fevers especially attacking children begin to prevail more extensively upon the opening of the schools in the fall, continue until school closes in the spring, and in vacation markedly diminish.

(2) The confinement at school in unevenly warmed, improperly lighted and badly ventilated rooms engender diseases of the respiratory tract, malnutrition, neurasthenia and various psychoses.

(3) Ill-fitting seats cause curvature of the spine and other injuries, producing traumatic neuroses.

It is the duty of physicians to inform their families concerning the facts and point out that the remedy consists in medical school inspection and proper hygienic control of the schools.

REPORT OF COMMITTEE ON NECROLOGY.

DR. G. W. H. KEMPER, CHAIRMAN.

A letter was addressed to the Secretary of each county society in the State, asking for a report of any death occurring during the past year. The following counties reported that no deaths had occurred:

Bartholomew, Benton, Cass, Clay, Daviess, Dearborn, Decatur, Floyd, Gibson, Hamilton, Henry, Johnson, Jennings, Knox, Orange, Owen, Perry, Posey, Rush, Spencer, Union, White. Total, 22.

The following counties reported deaths:

Allen County, Dr. Aaron E. Van Buskirk.
Clark County, Dr. Daniel V. Scott.
Fountain County, Dr. George C. Hays.
Jackson County, Dr. T. S. Galbraith.
Jefferson County, Dr. W. A. McCoy.
Marion County, Dr. John F. Geis, Dr. Hugh M. Lash, Dr. George W. Nash.
Randolph County, Dr. Allen H. Farquhar.
St. Joseph County, Dr. Sarah F. Stockwell.
Shelby County, Dr. James H. Sanford.
Tippecanoe County, Dr. Luther M. Irwin.
Wayne County, Dr. James F. Hibberd.
Greene County, Dr. Samuel C. Cravens.

Summary: Twenty-two counties reported no death. Twelve counties reported a death list. Total number of deaths, fourteen.

SAMUEL C. CRAVENS, M. D.

MEMBER OF THE GREENE COUNTY MEDICAL SOCIETY.

BORN IN HANOVER, INDIANA, JANUARY 3, 1839.

DIED AT BLOOMFIELD, INDIANA, SEPTEMBER 5, 1903.

AGED 64 YEARS.

Dr. Cravens read medicine with Dr. Jason N. Conley from 1861 to 1863, when he entered Rush Medical College at Chicago and was graduated in the profession he loved in 1866. In 1870 he took a post-graduate course at Long Island College Hospital of Brooklyn, N. Y., and in 1882, a post-graduate course at Rush Medical.

In 1866 he married Mary L. Routt, of Bloomfield, eldest daughter of William K. and Esther J. Routt, of old and respected families. He left surviving him his widow, Mary L. Cravens, two sons, Dr. Wm. R. Cravens, George E. Cravens, druggist, and Mrs. William L. Slinkard and Miss Maud Cravens, all of Bloomfield, Ind. In his chosen profession he was always ambitious to climb to the highest attainment, and was ever a clean, honorable, just, sober, conscientious citizen and practitioner. He was a man devoted to his family and friends, and was loved and cherished by all for his patience, kindness and charity. He was always a particular friend to the struggling and energetic young man, and many received their early assistance and start in medicine under his instructions and fatherly encouragement. His every effort was to increase the usefulness and honor of his profession and the high standing of his professional brother. He was a man of sterling worth, a gentleman and a practitioner of the true Christian virtue, "Love thy neighbor as thyself." His death was untimely, an unfathomable loss as a husband, father, physician, citizen and friend. He died as he lived, as silent and peaceful as the love which he held for all men.

(Prepared by his son, Dr. William R. Cravens, Bloomfield, Ind.)

ALLEN HOWELL FARQUHAR, M. D.

MEMBER OF THE RANDOLPH COUNTY MEDICAL SOCIETY.

BORN IN CLINTON COUNTY, OHIO, AUGUST 28, 1835.

DIED AT RIDGEVILLE, INDIANA, APRIL 18, 1904.

AGED 68 YEARS.

Dr. Farquhar received his education in the common schools of Randolph County, at Liber College, in Jay County, and at Marion Academy, in Grant County. He taught in Randolph, Grant, Wabash and Wayne counties for twelve years, the last two years being devoted to high school work.

He was married to Esther A. Roberts, of Wabash County, October 29, 1862. To them three daughters were born, the oldest and youngest of whom are living. He began the study of medicine in 1866 and spent the greater part of the year 1867 studying, doing office work and some visiting of patients with Dr. J. W. Botkin, of Unionport. He attended Eclectic Medical College at Cincinnati in 1867 and 1868, graduating from that institution in May, 1868, and practiced at Unionport until removing to Ridgeville, August 10, 1871, at which place he has lived and worked for thirty-three years. Of his professional interest, affiliations and progressiveness, the medical fraternity of Randolph County probably will need no information. His untiring energies were always spent in building up the educational and moral interests of the communities in which he lived. He died of carcinoma of the stomach, after an illness of several months.

(Prepared by his daughter.)

THOMAS S. GALBRAITH, M. D.

MEMBER OF THE JACKSON COUNTY MEDICAL SOCIETY.

BORN IN BARTHOLOMEW COUNTY, INDIANA, MARCH 9, 1843.

DIED AT SEYMOUR, INDIANA, FEBRUARY 23, 1904.

AGED 61 YEARS.

Dr. Galbraith's early education was obtained at Hartsville College. He attended his first course of lectures at the University of Michigan, Ann Arbor, 1864-65, and was graduated from the Ohio Medical College in the class of 1866. He began the practice of medicine in Bartholomew County, but in 1870 removed to Seymour, where he continued actively in practice up to the time of his death, except from the year 1887 until 1889, when he held the superintendency of the Central Indiana Hospital for the Insane, and from 1895 to 1897, when he with others owned and conducted an institution in Oklahoma for the care of the territorial insane. He was a student in his profession and kept pace with the progress of his co-laborers. The winters of 1877, 1880 and 1881 were spent in post-graduate work in New York, and during the year 1886 he spent several months abroad in visiting the hospitals of Europe.

Dr. Galbraith was the second time married to Miss Mary C. Graham in 1893, who survives, with two daughters and one son. His death was due to pneumonia of four days' duration.

(Prepared by Dr. J. M. Shields, Seymour, Ind.)

JOHN FRANK GEIS, M. D.

MEMBER OF THE MARION COUNTY MEDICAL SOCIETY.

BORN IN INDIANAPOLIS, INDIANA, AUGUST 26, 1868.

DIED AT INDIANAPOLIS, INDIANA, MARCH 7, 1904.

AGED 35 YEARS.

Dr. Geis was born and reared in Indianapolis. He graduated at St. Mary's School, and at the Medical College of Indiana in 1890. While a student in the college his studious habits and capacity were early recognized and he served in various capacities as an assistant. Working under some special disadvantages, he courageously made his own way and climbed toward the top. With a special interest in chemistry, he took post-graduate work at DePauw University under Dr. P. S. Baker, whose assistant he afterward became in the Medical College of Indiana. He was promoted in the Department of Medical Chemistry until, after the death of Dr. Baker, he became his successor in the full chair of chemistry and toxicology. He was a hard worker, untiring in his zeal for the advancement of his department and in devotion to the interests of his students. Dr. Geis had, a year or two ago, published a book upon his special line of study, which had been very favorably received, and had gained repute as an expert upon medico-legal and toxicological questions. His practice was limited to office work and medico-legal examinations. He was deputy coroner at the time of his death.

He married Miss Pauline Mueller in 1897, who survives him. In the midst of active work he was stricken with a malignant type of lobar pneumonia, death coming in less than a week. The funeral services were held at St. Mary's Roman Catholic Church, of which he was a member. He was buried in the German Catholic cemetery. Dr. Geis was one of the most highly esteemed and valued medical teachers in Indianapolis, both in the estimation of students and faculty, and a career of marked usefulness and honor was cut short by his untimely death.

(Prepared by Dr. Theodore Potter, Indianapolis, Ind.)

GEORGE C. HAYS, M. D.

MEMBER OF THE FOUNTAIN COUNTY MEDICAL SOCIETY.

BORN IN DARKE COUNTY, OHIO, JANUARY 22, 1836.

DIED AT HILLSBORO, INDIANA, OCTOBER 26, 1903.

AGED 67 YEARS.

Dr. Hays was five years old when his parents moved to Montgomery County, Indiana. He spent his youthful days on a farm, attending school in one of the old pioneer log schoolhouses, and was taught the common branches. Later he advanced into higher branches without a teacher, and soon began teaching school. In 1862 he began reading medicine, and pursued this study until he entered the army as a second lieutenant in the One Hundred and Fifty-fourth Regiment Indiana Volunteers, and served until the close of the War of the Rebellion, after which he began the study of medicine again, and in 1867 took a full course of lectures in the University of Michigan. In 1868 he settled in Hillsboro, Ind., and remained there until his death. He immediately built up a large and lucrative practice and was very popular with all the people and physicians in the surrounding country. In 1878 he graduated at the College of Physicians and Surgeons, afterwards the Medical College of Indiana, and held a diploma from the latter institution.

He was married in November, 1868, to Miss Mary A. Rivers, who died several years ago, to whom was born Miss Vonia V., now living at Hillsboro, Ind. In politics he was a Democrat, and member of the I. O. O. F. A few years ago he united with the Christian Church. He never held any public office. Dr. Hays was a careful and successful practitioner and well versed in medicine, a safe counselor, and beloved by all. He was one of the founders of the only medical society ever held in Fountain County, which was organized in 1867, being one of the oldest medical societies in Indiana, and at the writing of this sketch the writer is the only living founder of that society. Dr. Hays loved to associate with medical men, always attending his county society, of which he was often the president. About two years before he died pulmonary tuberculosis developed. He worked up to his last day, seeing a patient in consultation the day before he died. The funeral of Dr. Hays was the largest ever held in his home town, and was attended by a large number of physicians from the surrounding country.

(Prepared by Dr. George Rowland, Covington, Ind.)

JAMES FARQUHAR HIBBERD, M. D.

MEMBER OF THE WAYNE COUNTY MEDICAL SOCIETY.

BORN IN NEW MARKET, MARYLAND, NOVEMBER 4, 1816.

DIED AT RICHMOND, INDIANA, SEPTEMBER 8, 1903.

AGED 87 YEARS.

From 1825 to 1837 Dr. Hibberd lived with his uncle, Aaron Hibberd, near Martinsburg, Berkley County, Virginia, attending school and working on the farm and in a woolen mill. He subsequently took a course in the Hallowell Classical School at Alexandria, Va. In 1837 he took charge of his father's farm, near Springboro, Warren County, Ohio. Having chosen the medical profession as his life work, in 1838 he commenced reading under his cousin, Aaron Wright. In 1839-40 he attended lectures in the medical department of Yale College and August 14, 1840, he commenced practicing at Salem, Ohio. In 1848 he entered the College of Physicians and Surgeons, New York, and graduated in March, 1849. He was immediately appointed surgeon of the steamship "Senator," which made a trip to the Amazon River, Rio Janeiro, St. Catherines, Patagonia and Chili and the cities on the Pacific coast of South and Central America, thence to San Francisco, Cal., the voyage consuming seven and a half months. He remained in California till 1855, practicing medicine and dealing extensively in real estate. The fall and winter of 1855-56 he spent in New York, reviewing his medical studies. In June, 1856, he opened an office in Dayton, Ohio, but four months later removed to Richmond, Ind., where he built up a large and lucrative practice. During the season of 1860-61 he filled the chair of Physiology and General Pathology in the Ohio Medical College, Cincinnati. Dr. Hibberd was a member of the city, county, district, State, tri-State, Rocky Mountain and American medical associations, and was president of all, the last named association having conferred that honor on him at Milwaukee for the year in 1893; he served in San Francisco in 1894. The doctor has written a number of medical essays. The years 1869 and 1870 were spent in traveling in the Old World. He served in the Ohio State Legislature from 1845 to 1847. He was a member of the Richmond City Council from 1872 to 1874, and the succeeding years was mayor of Richmond. He was for many years a member of the Odd Fellows' fraternity; was a member of the Grand Lodge, and was High Priest of the Encampment at Dayton, Ohio, but in 1850 his papers were sent from Dayton to California and were lost, and he never applied for reinstatement.

Dr. Hibberd was married three times. His first wife was Nancy D. Wiggins, whom he married in March, 1842, in Montgomery County, Ohio. In May, 1856, he married Catherine Leeds in Richmond, and in April, 1871, he married Elizabeth M. Laws. His children are E. G. and Wilton Hibberd. The widow survives. During the life of the Tuesday Club Dr. Hibberd was one of its most active members.

(Prepared by Dr. David W. Stevenson, Richmond, Ind.)

LUTHER MARTIN IRWIN, M. D.

MEMBER OF THE TIPPECANOE COUNTY MEDICAL SOCIETY.

BORN IN DAYTON, OHIO, JULY 2, 1855.

DIED AT LAFAYETTE, INDIANA, SEPTEMBER 17, 1903.

AGED 48 YEARS.

Dr. Irwin received a common school education at his home in Ohio and began teaching school when he was sixteen years old. In 1878 he began the study of medicine under Prof. Yohn, at Valparaiso. He entered Rush Medical College at Chicago, and graduated with honor in February, 1882, when he came to Lafayette and located and practiced until his death. He was a member of the Lincoln Club, the Knights of Pythias, Royal Arcanum and Eagles. The first year after locating in Lafayette he was Health Officer of Tippecanoe County. In 1885 he was vice-president of the Tippecanoe County Medical Society. He was a member of the American Medical Association. In 1890 he was Coroner of Tippecanoe County.

He was married December 31, 1884, to Miss Addie Coleman, who, with two daughters, Miss Julia and Adaline, survive. Dr. Irwin rapidly gained an extensive practice and wide acquaintance, and was known as one of the most thorough and earnest practitioners in this section of the country. Four years ago last October he went to Chicago to consult his friend and former classmate, Dr. J. B. Murphy. He had been suffering for a few months prior to that time from a supposed stone in his kidney. Dr. Murphy decided that he had a stone in his left kidney and operated upon him. The stone was removed, but the doctor never fully regained his former good health and was compelled to give up a great deal of his practice. The wound never fully healed and Dr. Murphy had advised him to have the kidney removed. For two or three months previous to his death he had not felt as well as usual, but said nothing about it to his family. His death was sudden, due to uræmic poisoning.

(Prepared by John C. Morrison, M. D., Lafayette, Ind.)

HUGH MORRISON LASH, M. D.

MEMBER OF THE MARION COUNTY MEDICAL SOCIETY.

BORN IN ATHENS COUNTY, OHIO, JUNE 11, 1844.

DIED AT INDIANAPOLIS, INDIANA, SEPTEMBER 19, 1903.

AGED 59 YEARS.

Hugh Morrison Lash was born on a farm near Athens, Ohio. His parents were Jacob and Susan Morrison Lash. He graduated at the Ohio University, Athens, in 1869, and at the Cincinnati College of Medicine and Surgery in 1870. He practiced at Athens till 1890, when he moved to Indianapolis. He studied medicine one term at Cleveland, Ohio, and spent the winter of 1880 in post-graduate work at Jefferson College, Philadelphia.

Dr. Lash first married Mrs. Mary B. Patrick, nee Rice, who left a daughter by a former husband, and a son, Morrison Rice Lash. The daughter is married to Dr. T. P. Adair, of Marion, Ohio. In 1885 he married Miss Mary Whittlesey, of Canfield, Ohio, who survives him. He was a prominent and active citizen during his life at Athens, where he held various positions of trust and honor. For some time he was a director of the State Insane Hospital at Athens. In Indianapolis Dr. Lash soon became recognized and esteemed as a man of ability and force. He was President of the County Medical Society in 1897, and was Secretary of the Indiana Medical Journal Publishing Company from the time of its organization. At the time of his death he was a member of the City Board of Health, and was lecturer upon the Physiology of the Nervous System and Clinical Psychiatry in the Medical College of Indiana. For several years he had given most acceptable clinical lectures at the Central Hospital for Insane. He was a member of the Methodist Church and of the Masonic fraternity. Dr. Lash was a genial, jovial, hearty man; energetic, courageous, of good judgment and unusual executive ability. He had a large and varied experience in medicine and surgery, was a very capable practitioner, and as such was successful almost from the start in Indianapolis. He was active up to within a week of his death, though he had suffered for several years from gall-stones, gastro-duodenal catarrh, and a mitral lesion. Brief services were held at his home, No. 1529 Park Avenue, the funeral and burial being at Athens, Ohio.

(Prepared by Dr. Theodore Potter, Indianapolis, Ind.)

WILLIAM A. McCOY, M. D.

MEMBER OF THE JEFFERSON COUNTY MEDICAL SOCIETY.

BORN IN WOOSTER, OHIO, OCTOBER 27, 1843.

DIED AT MADISON, INDIANA, MAY 8, 1904.

AGED 61 YEARS.

Doctor McCoy moved with his parents to Indiana when fifteen years of age. His fundamental education was obtained in the common and high schools of his time, and when arriving at manhood he entered Rush Medical College, at Chicago, Ill., and was a student in that institution when it burned. He afterwards enlisted in the One Hundred and Fifty-second Indiana Volunteer Infantry and served to the end of the civil war. When he was discharged he entered the Medical College of Indiana, from which institution he graduated in 1872. After graduation he commenced practicing in Peru, Ind., where he practiced until 1877, when he moved to Hanover, Ind., where he practiced his profession until 1882, when he moved to Madison, Ind., where he resided and continued his profession. In 1890 he entered the New York Polyclinic School of Medicine, taking a post-graduate course on diseases of the nose and throat, of which he made a specialty. He was in active practice until within a few months of his death. He was always ready and willing to do anything he could for the advancement of his chosen profession, in which he stood high in his county, the Indiana State and American Medical Association, and in his death we feel we have lost a wise counselor, a staunch friend and a noble citizen.

(Prepared by Dr. N. A. Kremer, Madison, Ind.)

GEORGE WASHINGTON NASH, M. D.

MEMBER OF THE MARION COUNTY MEDICAL SOCIETY.

BORN IN HENDRICKS COUNTY, INDIANA, OCTOBER 15, 1835.

DIED AT INDIANAPOLIS, INDIANA, JULY 26, 1903.

AGED 68 YEARS.

Dr. Nash was a retired practitioner, having suffered a paralytic attack in 1900. Up to that time he had been in active practice on the south side of the city. He was in the drug business in Brownsburg in 1860 and at Covington in 1870. For several years he was a commercial traveler. After his fiftieth year he graduated from the Central College of Physicians and Surgeons, continuing his drug store and practice until compelled to retire by illness. He died at his home, No. 2619 North Delaware Street, from a stroke of paralysis. He was coroner of Marion County from 1898 to 1901. Dr. Nash was a genial and kindly man, esteemed by his patrons and the profession.

He leaves a widow and four children—William B., Lee T., and Dolly Nash of Indianapolis, and Mrs. T. L. Settle, of Clarksville, Tenn.

(Prepared by Dr. Theodore Potter, Indianapolis, Ind.)

JAMES HENRY SANFORD, M. D.

MEMBER OF SHELBY COUNTY MEDICAL SOCIETY.

BORN IN ALBANY, NEW YORK, JUNE 22, 1838.

DIED AT SHELBYVILLE, INDIANA, SEPTEMBER 7, 1903.

AGED 65 YEARS.

Dr. Sanford was a graduate of the Central Medical College of Indianapolis. He was a member of the Methodist Episcopal Church, the A. O. U. W., and Knight Templars.

He married Elizabeth Toner in 1884, who, with a daughter, survives him. His death was due to suicide.

(Prepared by Dr. Bayard G. Keeney, Shelbyville, Ind.)

SARAH F. STOCKWELL, M. D.

MEMBER OF THE ST. JOSEPH COUNTY MEDICAL SOCIETY.

BORN IN LAGRANGE COUNTY, INDIANA, NOVEMBER 11, 1841.

DIED AT SOUTH BEND, INDIANA, APRIL 9, 1904.

AGED 63 YEARS.

Dr. Stockwell attended the public schools, and later the Wolcottville Seminary. She graduated in medicine in 1876, at the University of Michigan. The same year she began the practice of medicine in South Bend, and, with the exception of one year spent in Portland, Ore., had been in continuous and successful practice at South Bend until seized with her fatal sickness. She was a prominent member of the local Ben-Hur lodge, and was also a member of the American Medical Association, the State Association and of the St. Joseph County Medical Society. Dr. Stockwell's maiden name was Sarah F. Fowler. She was married in 1857 to James Stockwell of Lagrange County, Indiana, and leaves two children, Adelbert Stockwell and Miss Lillian Stockwell, both of South Bend. She died of cancer of the uterus.

(Prepared by Dr. H. F. Mitchell, South Bend, Ind.)

DANIEL VOORHEES SCOTT, M. D.

MEMBER OF CLARK COUNTY MEDICAL SOCIETY.

BORN IN FLOYD COUNTY, INDIANA, APRIL 14, 1872.

DIED AT JEFFERSONVILLE, INDIANA, JANUARY 6, 1904.

AGED 32 YEARS.

Dr. Scott was educated in the common schools of Floyd County, and graduated from the University of Louisville in 1894. He practiced medicine in Borden and Lanesville, Ind., and came to Jeffersonville in 1900, where he practiced until the time of his death. He was not a member of any church, but belonged to several benevolent societies and the Clark County Medical Society. Dr. Scott was a genial, whole-souled man and had made many friends during his four years' practice in our city.

He was married to Miss Catherine Strobel in November, 1895, to whom two children were born, all of whom survive him.

(Prepared by Dr. Claude C. Crum, Jeffersonville, Ind.)

AARON ELLIOT VAN BUSKIRK, M. D.

MEMBER OF ALLEN COUNTY MEDICAL SOCIETY.

BORN IN HARRISBURG, CARROLL COUNTY, OHIO, SEPTEMBER 27, 1847.

DIED AT FORT WAYNE, INDIANA, JANUARY 22, 1904.

AGED 56 YEARS.

Dr. Van Buskirk's early life was a struggle against adversity, but his mental qualities were of the kind that win, and he succeeded in pushing his way to an honored profession. He managed to attend the district schools and obtained the foundation for a good education. Later he taught school in Wisconsin and Ohio. He began the study of medicine in Millersburg, Ohio, in 1872, while teaching school. In 1873 he attended the Medical Department at the Wooster University, in Ohio, and after a term of lectures received his license as a physician and began the practice of medicine at Monroeville, Allen County. He graduated from the Medical College of Ohio in 1876, and continued his practice at Monroeville until March 20, 1877, when he removed to Fort Wayne, and up to the time of his death continued in practice there.

He was married June 1, 1876, to Miss Mary J. Gray, at Millersburg, Ohio. Surviving him are his wife and the following children: Mrs. G. C. Woebbeking and Miss Bessie Van Buskirk, of Fort Wayne, Ind. He was a member of the Westminster Presbyterian Church, and a Past Master of Wayne Lodge, No. 25, F. A. M. In the medical profession Dr. Van Buskirk was acknowledged as one of the ablest. He was an active member of the Allen County Medical Society, and at the time of his death was vice-president. In the Fort Wayne College of Medicine he was for a number of years an active member of the faculty, and taught at various times the following branches: Anatomy, Physiology, Pathology, Surgery, Theory and Practice, and Diseases of the Nervous System. In politics he was formerly a Democrat, but for the last twenty-four years he has voted with the Prohibition party. For the past four years he has been the Deputy Coroner of Allen County, serving as such under Dr. W. W. Barnett, and in the discharge of the duties of the office he has shown ability. The medical profession of Fort Wayne unite in speaking of Dr. Van Buskirk as a physician of high skill. In his practice he was kind and humane, devoted to his patients and winning their confidence and love by his unswerving attention. He was a Christian citizen of high type, practicing the principles of the religion he professed. His death was due to pneumonia, complicated by gallstones.

(Prepared by Dr. J. C. Wallace, Fort Wayne, Ind.)

REPORT OF THE HOUSE OF DELEGATES.

The House of Delegates met at 2 p. m., May 18th, and no quorum being present adjourned to 8 p. m., when reports were received from Secretary Heath showing thirteen new county societies and a paid membership to that date of 1,941.*

The report from Treasurer Bulson showed all bills paid (including $300 for expenses of Councilors) and about $50 still in the treasury.

The report from the Council showed the issue of seventy charters to county societies with fourteen applications in to be acted on at once.

The Secretary of the State Association was directed to send two notices of the annual meeting to each member and a circular letter to each delegate giving time and place of meeting of House of Delegates three days before the annual meeting.

The By-Laws were amended so as to make the first meeting of the House of Delegates at 8 p. m. on the day preceding the annual session and making the proportion of delegates one for every 100 members or major fraction thereof.

The salary of the Secretary was fixed at $300 per annum and an honorarium of $10 was voted to the Committee on Necrology.

An emergency fund not to exceed $100 for necessary expenses of postage, clerical work, etc., in the Secretary's office was established and $100 was appropriated for the expenses of the State Association Pathological Exhibit here and at Atlantic City.

On motion of Dr. W. N. Wishard resolutions were adopted requesting the State Board of Medical Registration and Examination not to recognize the proposed premedical courses in various colleges of arts, science and letters as an equivalent of the first two years in the medical college.

*Since increased to 2,107.

West Baden was chosen as the next place of meeting and the following officers were elected:

President—G. T. McCoy, Columbus.

Vice-Presidents—H. J. Hall, Franklin; C. T. Hendershot, Cannelton; D. J. Loring, Valparaiso.

Secretary—F. C. Heath, Indianapolis.

Treasurer—A. E. Bulson, Jr., Fort Wayne.

COUNCILORS.

First District—W. R. Davidson, Evansville, for one year.

Second District—Geo. Knapp, Vincennes, for two years.

Third District—Harry Sharp, Jeffersonville, for three years.

Fourth District—W. H. Stemen, North Vernon, for one year.

Fifth District—M. A. Boor, Terre Haute, for two years.

Sixth District—D. W. Stevenson, Richmond, for three years.

Seventh District—W. N. Wishard, Indianapolis, for one year.

Eighth District—G. W. H. Kemper, Muncie, for two years.

Ninth District—P. J. Barcus, Crawfordsville, for three years.

Tenth District—E. G. Blinks, Michigan City, for one year.

Eleventh District—Robert Hessler, Logansport, for two years.

Twelfth District—A. E. Bulson, Jr., Fort Wayne, for three years.

Thirteenth District—C. A. Daugherty, South Bend, for one year.

The President-elect was authorized to appoint the necessary committees. The following delegates to the American Medical Association were elected:

For one year—D. C. Peyton, Jeffersonville; W. N. Wishard, Indianapolis.

For two years—Edwin Walker, Evansville; C. A. Daugherty, South Bend.

Alternates—J. B. Garber, Dunkirk; G. F. Beasley, Lafayette; Walker Schell, Terre Haute; E. J. McOscar, Fort Wayne.

LIST OF MEMBERS PRESENT.

Jonas Stewart, Anderson.
M. F. Johnston, Richmond.
J. B. Berteling, South Bend.
Robert Hessler, Logansport.
C. A. Daugherty, South Bend.
John D. Cory, McCordsville.
B. Van Sweringen, Fort Wayne.
Myron A. Boor, Terre Haute.
Allen Pierson, Spencer.
Max A. Bahr, Indianapolis.
W. H. Waller, Angola.
I. N. Trent, Muncie.
G. W. Bucklin, Muncie.
E. B. Mann, Muncie.
O. C. Neier, Indianapolis.
Albert E. Bulson, Fort Wayne.
Wm. S. Beck, Indianapolis.
John Elfers, Rising Sun.
W. R. Davidson, Evansville.
S. P. Scherer, Indianapolis.
S. H. Malpas, Indianapolis.
Charles A. White, Danville.
Edward D. Millis, Plainville.
Geo. F. Smith, Weisburg.
W. F. Miranda, Walkerton.
Charles R. Bird.
J. H. Payne, Julietta.
Frank L. Truitt, Noblesville.
W. B. Fletcher, Indianapolis.
C. K. Bruner, Greenfield.
F. W. Foxworthy, Indianapolis.
A. W. Tobias, Elwood.
C. P. Runyan, Elwood.
H. H. Weer, Indianapolis.
Jos. B. Champion, New Palestine.
Chas. C. Cottingham, Indianapolis.
R. E. Brokaw, Portland.
C. T. Hendershot, Cannelton.
Geo. T. McCoy, Columbus.
Leander Brown, Elberfeld.
A. P. Brown, Elberfeld.
C. A. Caplinger, Wallace.
S. J. Young, Valparaiso.
N. P. Howard, Greenfield.
Wm. S. Tomlin, Indianapolis.
J. B. Fattic, Anderson.
J. T. McShane, Indianapolis.
A. M. Hayden, Evansville.
George Knapp, Vincennes.
Lillian A. Crockett, Indianapolis.
S. C. Johnson, Rensselaer.
L. G. Cromer, Union City.
M. Mayfield, Royal Center.
G. O. Cosby, Elizabethtown.
G. W. Kemper, Muncie.
John J. Kyle, Indianapolis.
David Ross, Indianapolis.
H. R. Spickerman, Muncie.
Wm. F. Clevenger, Indianapolis.
A. E. Vinton, Muncie.
W. F. Sharrer, Delphi.
Leo N. Herbert, Indianapolis.
Charles Ryker, Manville.
Fred R. Charlton, Indianapolis.
Amos L. Wilson, Indianapolis.
W. H. Stemm, North Vernon.
Louis Burckhardt, Indianapolis.
Charles J. Cook, Cowden.
L. C. Cline, Indianapolis.
Ernest Cooper, Plainfield.
F. A. Schell, Spencer.
Charles R. Sowder, Indianapolis.
Carl N. McCaslin, Earl Park.
S. C. Waters, Middletown.
Cameron Chamberlain, Indianapolis.
J. O. Stillson, Indianapolis.
S. C. Norris, Anderson.
Wm. N. Wishard, Indianapolis.

H. E. Phares, Shelbyville.
Wm. F. Batman, Ladoga.
O. E. McWilliams, Anderson.
Wm. L. Jennings, Bridgeport.
John F. Barnhill, Indianapolis.
Stanley Coulter, Lafayette.
George H. Herbert, Indianapolis.
George W. Combs, Indianapolis.
Henry W. Greist, Kennard.
Theodore E. Collier, Brook.
Homer J. Hall, Franklin.
W. D. Hoskins, Indianapolis.
E. R. Sisson, Maxwell.
Samuel E. Crose, Indianapolis.
Edward J. McOscar, Fort Wayne.
George J. Cook, Indianapolis.
J. H. Lanam, Franklin.
V. C. Patton, Morristown.
Henry Lohrmann, Indianapolis.
H. G. Gaylord, Indianapolis.
L. J. Baldwin, Hortonville.
F. A. Chenoweth, Winchester.
A. G. Rogers, Parker.
I. E. Dunlavey, Indianapolis.
J. M. Berauer, Indianapolis.
J. T. Bowen, Rushville.
R. M. Reagan, Monon.
C. L. Marlatt, Indianapolis.
George H. House, Indianapolis.
B. A. Brown, Indianapolis.
Fred Metts, Ossian.
Theodore Potter, Indianapolis.
T. V. Keene, Indianapolis.
C. S. Deitch, Indianapolis.
J. F. Robertson, Indianapolis.
Fletcher Hodges, Indianapolis.
Charles C. Crampton, Delphi.
H. O. Pantzer, Indianapolis.
A. C. Kimberlin, Indianapolis.
John L. Freeland, Indianapolis.
J. Rilus Eastman, Indianapolis.
R. H. Ritter, Indianapolis.
H. C. Robinson, Martinsville.
J. McLean Moulder, Kokomo.
George W. Wallage, Middletown.
C. J. Stover, Eaton.
W. I. Hoag, Indianapolis.
E. H. Griswold, Peru.
C. J. Loring, Rochester.
Hannah M. Graham, Indianapolis.
Emma J. Collop, Indianapolis.
L. H. Dunning, Indianapolis.
W. H. Wishard, Indianapolis.
H. C. Burcham, Albany.
S. R. Cunningham, Indianapolis.
H. P. Franks, Muncie.
C. C. Mills, Redkey.
Albert E. Sterne, Indianapolis.
H. W. Ridpath, Indianapolis.
C. C. Ray, Arcadia.
W. B. Robinson, Indianapolis.

TREASURER'S REPORT.

Albert E. Bulson, Jr., Treasurer, in account with the Indiana State Medical Association, for the year ending May 19, 1904:

1903.	DEBIT.	
June 5.	To cash on hand	$449 34
June 5.	To cash from Secretary, dues collected	1,598 00
July 2.	To cash from Chairman Committee on Arrangements, Richmond meeting, balance remaining after payment of expenses 1903 meeting	14 77
Dec. 11.	To cash from Secretary, dues collected	133 00
		$2,195 11

CREDIT.	
By cash to Secretary, honorarium, postage and 10 per cent. of dues	$291 00
Chairman Committee on Pathology, exhibit expenses at 1903 meetings of the Indiana State Medical Association and the American Medical Association	150 00
Chairman of Committee on Publication, honorarium	100 00
Chairman of Committee on Necrology, honorarium and incidental expenses	13 20
J. B. Champion, stenographer, 1903 meeting	85 00
Sentinel Printing Company, stationery and printing	28 07
American Medical Association, reorganization	69 75
Wm. B. Burford, 1903 transactions	802 51
Archer Printing Co., council printing	88 50
Fort Wayne Box Co	2 50
Globe Wernicke Co., card index	33 43
S. H. East, Medical Legislation Committee	24 00
Cleary & Bailey, sundries	2 25
Secretary of the Council for express, freight, telegraph, telephone and stenographer's charges	66 74
Total	$1,756 95
To balance on hand	438 16
	$2,195 11

Your Treasurer has on hand the unpaid bills of the Councilors for expenses incurred in reorganization, amounting to approxi-

mately $400, which upon approval will be paid, leaving a balance of approximately $50 in the treasury with all indebtedness of the Association paid.

Respectfully submitted,
ALBERT E. BULSON, Jr.,
Treasurer.

Approved:
GEO. T. McCOY,
ROBERT HESSLER,
C. A. DAUGHERTY,
Auditing Committee.

LIST OF MEMBERS

OF THE

INDIANA STATE MEDICAL ASSOCIATION.

ADAMS COUNTY.

OFFICERS.

H. F. Costello, President.
James S. Boyers, Vice-Pres.
P. B. Thomas, Sec.-Treas.

CENSORS.

C. S. Clark.
J. M. Miller.
W. W. P. McMillen.

MEMBERS.

Aspy, H. M., Geneva.
Beavers, Seth D., Decatur.
Boyers, James S., Decatur.
Clark, C. S., Decatur.
Clark, D. D., Decatur.
Costello, H. F., Decatur.
Coverdale, J. S., Decatur.
Coverdale, Earl G., Decatur.
Keller, H. E., Decatur.
Miller, James M., Decatur.
McMillen, W. W. P., Decatur.
Parrish, M. F., Monroe.
Thomas, P. B., Decatur.
Willson, R. S., Berne.

FT. WAYNE (ALLEN COUNTY) MEDICAL SOCIETY.

OFFICERS.

Elmer E. Morgan, President.
Jesse C. Calvin, Vice-Pres.
J. C. Wallace, Secretary.
W. P. Whery, Treasurer.
B. Van Sweringen, Delegate.

CENSORS.

G. B. Stemen.
Mary A. Whery.
G. B. M. Bower.

MEMBERS.

Adams, Horace E., Harlan.
Barnett, Chas. E., Ft. Wayne.
Barnett, W. W., Ft. Wayne.
Boyers, J. S., Decatur.
Beavers, S. D., Decatur.
Bower, G. B. M., Ft. Wayne.
Buchanan, A. P., Ft. Wayne.
Bulson, A. E., Jr., Ft. Wayne.
Bell, E. Edwin, Ft. Wayne.
Brudi, G. G., New Haven.
Calvin, W. D., Ft. Wayne.
Calvin, J. Carrithers, Ft. Wayne.
Crull, E. A., Ft. Wayne.
Chambers, J. I., Ft. Wayne.
Carey, W. W., Spencerville.
Dancer, Chas. R., Ft. Wayne.

Deming, N. L., Ft. Wayne.
Dinnen, Jas. M., Ft. Wayne.
Drayer, L. P., Ft. Wayne.
Duemling, H. A., Ft. Wayne.
English, C. H., Ft. Wayne.
Ensler, Wm. M., Ft. Wayne.
Geary, J. K., Ft. Wayne.
Greenawalt, G. L., Ft. Wayne.
Greenwell, F., Huntertown.
Gross, W. O., Ft. Wayne.
Hammond, A. K., Ft. Wayne.
Havice, S. H., Ft. Wayne.
Hetrick, J., Ft. Wayne.
Hollingsworth, S. G., Harland.
Kesler, A. J., Ft. Wayne.
Macbeth, Harriet S., Ft. Wayne.
Macbeth, A. H., Ft. Wayne.
McCaskey, G. W., Ft. Wayne.
McEvoy, J. B., Ft. Wayne.
McHugh, J. E., Ft. Wayne.
McKernan, R. B., Ft. Wayne.
McOscar, E. J., Ft. Wayne.
Mentzer, S. E., Monroeville.
Mercer, J. D., Poe.
Hoffman, G. H., Ft. Wayne.
Beall, Ch. G., Ft. Wayne.
Price, C. R., Monroeville.
Gordon, C. W., Ft. Wayne.
Morgan, Elmer E., Ft. Wayne.
Myers, Wm. H., Ft. Wayne.
Nieschang, C. C. F., Ft. Wayne.
Null, L. S., New Haven.
Porter, Miles F., Ft. Wayne.
Proegler, Carl, Ft. Wayne.
Ranke, J. H., Ft. Wayne.
Rhamy, B. W., Ft. Wayne.
Rosenthal, I. M., Ft. Wayne.
Rosenthal, M. I., Ft. Wayne.
Ruhl, W D., Ft. Wayne.
Schilling, Carl, Ft. Wayne.
Schilling, Jno., Ft. Wayne.
Schneider A. L., Ft. Wayne.
Siver, E. L., Ft. Wayne.
Sledd, S. D., Ft. Wayne.
Stemen, C. B., Ft Wayne.
Stemen, G. B., Ft. Wayne.
Stultz, J. E., Ft. Wayne.
Thomas, Chas. E., Leesburg.
Taylor, D. B., Ft. Wayne.
Van Buskirk, E. M., Ft. Wayne.
Van Sweringen, H., Ft. Wayne.
Van Sweringen, B., Ft. Wayne.
Van Sweringen, G., Ft. Wayne.
Wallace, J. Clifford, Ft. Wayne.
Weaver, B. P., Ft. Wayne.
Wheelock, K. K., Ft. Wayne.
Whery, Mary A., Ft. Wayne.
Whery, Wm. P., Ft. Wayne.
White, R. P., Ft. Wayne.
Williams, Alice B., Columbia City.
Williams, C. S., Columbia City.
Wybourn, D. C., Sheldon.
Kane, Alfred, Ft. Wayne.
Ross, Geo. A., Ft. Wayne.

BARTHOLOMEW COUNTY.

OFFICERS.

John Little Morris, President.
F. D. Norton, Vice-President.
R. E. Holder, Sec.-Treas.
Geo. O. Cosby, Delegate.

CENSORS.

Wm. H. Butler.
E. U. Wood.
S. M. Voris.

MEMBERS.

Arwine, John S., Columbus.
Armbruster, B. F., Columbus.
Banker, A. J., Columbus.
Banker, W. T., Columbus.
Butler, Wm. H., Columbus.
Bice, L. C., Columbus.
Benham, J. W., Columbus.
Cosby, Geo. O., Burnsville.
Clouse, Bertha A., Hope.
De Long, O. A., Azalia.
Elrod, M. N., Columbus.
Francis, E. T., Columbus.

Fitzpatrick, B., Columbus.
Hawes, James K., Clifford.
Hawley, Koert D., Columbus.
Holder, R. E., Columbus.
Kirkpatrick, A. M., Columbus.
Kamman, H. H., Columbus.
McCoy, Geo. T., Columbus.
Marshall, D. J., Columbus.
Mennet, O. H., Columbus.
Morris, John Little, Columbus.
Norton, F. D., Petersville.
Norton, Wm. J., Hope.
Regennas, E. G., Hope.
Roope, A. P., Columbus.
Suverkrup, Lotta R. A., Columbus.
Voris, S. M., Columbus.
Wisner, W. E., Columbus.
Wood, E. U., Columbus.

BENTON COUNTY.

OFFICERS.

Clark Cook, President.
S. C. Fenton, Vice-President.
Carl N. McCaslin, Sec.-Treas.
Carl N. McCaslin, Delegate.

CENSORS.

R. C. N. Cook.
H. G. Bloom.
J. W. McMahan.

MEMBERS.

Allen, Chas. B., Fowler.
Atkinson, Curtis, Oxford.
Bloom, H. G., Oxford.
Cook, Clark, Fowler.
Cook, R. C. N., Boswell.
Eads, C. V., Ambia.
Fenton, S. C., Boswell.
Mavity, D. E., Fowler.
McCaslin, Carl N., Earl Park.
McMahan, J. W., Earl Park.
Neighbor, A. G., Fowler.
Parker, E. E., Oxford.
Parkinson, W. M., Boswell.
Pratt, B. W., Goodland.
Smith, W. A., Otterbein.

BLACKFORD COUNTY.

OFFICERS.

C. R. Mason, President.
H. C. Davisson, Vice-Pres.
Eueidas K. Scott, Sec.-Treas.

CENSORS.

M. M. Clapper.
C. W. Corey.
J. H. D. Lorimore.

MEMBERS.

Clapper, Manton M., Hartford City.
Corey, Chas. W., Hartford City.
Davisson, Henry C., Hartford City.
Hollis, Ella A., Hartford City.
Hollis, Samuel, Hartford City.
Hollis, William A., Hartford City.
Landon, Lewis C., Priam.
Lorimore, J. H. C., Hartford City.
Mason, Charles R., Hartford City.
Reynolds, Francis M., Montpelier.
Scott, Eueidas K., Hartford City.
Shull, Charles Q., Montpelier.
Taylor, James A., Montpelier.
Thornton, Walter E., Montpelier.

BOONE COUNTY.

OFFICERS.

L. P. Engleman, President.
A. P. Fitch, Vice-President.
W. H. Williams, Secretary.
J. S. Reagan, Treasurer.
A. P. Fitch, Delegate.

CENSORS.

J. S. Shields.
C. D. Umberline.
W. H. Schultz.

MEMBERS.

Austin, F. M.,* Jamestown.
Brent, I. N., Jamestown.
Bonnell, T. A., Jamestown.
Brendel, John F., Zionsville.
Ball, J. R., Lebanon.
Engleman, L. P., Reese Mills.
Fitch, A. P., Lebanon.
Hardy, J. S., Lebanon.
Hurt, G. K., Thornton.
Jones, A. B., Lebanon.
Little, P. B., Whitestown.
Lee, D. F., Zionsville.
Reagan, J. S., Lebanon.
Rose, M. H., Thorntown.
Shields, J. S., Elizaville.
Schultz, W. H., Lebanon.
Smith, C. H., Lebanon.
Smith, De. L., Lebanon.
Schultz, Guy A., Lebanon.
Umberline, C. D., Reese Mills.
Van Nuys, Mary M., Lebanon.
Williams, W. H., Lebanon.

* Deceased.

CARROLL COUNTY.

OFFICERS.

W. F. Sharrer, President.
Chas. C. Crampton, Sec.-Treas.
Chas. C. Crampton, Delegate.

CENSORS.

Chas. E. Angell.
W. R. Quick.

MEMBERS.

Angell, Chas. E., Delphi.
Carney, C. E., Delphi.
Crampton, Chas. C., Delphi.
Hickman, C. C., Yeoman.
Quick, W. R., Delphi.
Sharrer, W. F., Delphi.

CASS COUNTY.

OFFICERS.

Arthur J. Herrmann, President.
Charles H. McCully, Vice-Pres.
Geo. D. Miller, Sec.-Treas.
Robert Hessler, Delegate.

CENSORS.

John A. Little.
John P. Hetherington.
John M. Pulliam.

MEMBERS.

Bell, Wm. H., Logansport.
Bartholomew, A. C., Logansport.
Barnfield, J. H., Logansport.
Cady, N. W., Logansport.
Elder, Edward C., Logansport.
Hallanan, Joseph, Logansport.
Herrmann, A. J., Logansport.
Herrmann, F. J., Logansport.

Hessler, Robert, Logansport.
Hill, Henry B., Logansport.
Hetherington, J. P., Logansport.
Little, John A., Logansport.
McCully, Charles H., Logansport.
Miller, Geo. D., Logansport.
Parrish, Rebecca, Logansport.
Pulliam, John M., Logansport.
Powell, Jehu Z., Logansport.
Rogers, Joseph G., Logansport.
Rubsam, Joseph, Logansport.
Stevens, B. C., Logansport.
Thomas, Charles L., Logansport.
Tucker, Arthur W., Logansport.
Terflinger, T. W., Logansport.
Palmer, Adlebert L., Logansport.
Snyder, A. D., Miles, Washington.
Gilbert, J. L., Logansport.

HONORARY.

Powell, Jehu Z., Logansport.

CLARK COUNTY.

OFFICERS.

D. C. Peyton, President.
E. L. Elrod, Vice-President.
C. C. Crum, Sec.-Treas.
Cadwalader Jones, Delegate.

CENSORS.

Marshall Varble.
H. C. Sharp.
Wm. H. Sheets.

MEMBERS.

Coombs, David, Charlestown.
Crum, Claude C., Jeffersonville.
Elrod, E. L., Henryville.
Flynn, Edw. N., Jeffersonville.
Field, David L., Jeffersonville.
Graham, Oliver P., Jeffersonville.
Hancock, C. F. C., Jeffersonville.
Jones, Cadwalader, Charlestown.
McBride, Isaac, Jeffersonville.
Peyton, David C., Jeffersonville.
Reynolds, Jas. M., Memphis.
Ruddell, I. N., Jeffersonville.
Samuels, W. L., Winnemucca, Nev.
Sharp Harry C., Jeffersonville.
Sheets, Wm. H., Jeffersonville.
Stockwell, John, Charlestown.
Stalker, Bodine, Borden.
Varble, W. M., Jeffersonville.
Walker, Jas. H., Henryville.
Wolfe, F. E., Jeffersonville.
Zioerner, Joseph, Jeffersonville.

CLAY COUNTY.

OFFICERS.

G. M. Pell, President.
J. D. Sourwine, Vice-Pres.
F. C. Dilly, Sec.-Treas.
G. W. Finley, Delegate.

CENSORS.

George F. Lewis.
Fred Nussell.
Junius L. Lambert.

MEMBERS.

Dilly, Fred C., Brazil.
Finley, George W., Brazil.
Lambert, Junius L., Brazil.
Lewis, George F., Knightsville.
Mendenhall, Pleas. W., Asherville.
Nussell, Fred, Brazil.
Pell, Geo. M., Carbon.
Sourwine, John D., Brazil.

CLINTON COUNTY.

OFFICERS.

W. H. Curtiss, President.
Chas. Chittick, Vice-Pres.
M. T. McCarty, Sec.-Treas.
Chas. Chittick, Delegate.

CENSORS.

S. B. Sims.
W. J. Fernald.
J. E. Robison.

MEMBERS.

Alexander, W., Frankfort.
Curtiss, W. H., Frankfort.
Chittick, Chas., Frankfort.
Fernald, W. J., Frankfort.
Gard, O., Frankfort.
Hammersley, W. L., Frankfort.
Hatfield, J. F., Moran.
Hadley, Jas. W., Rossville.
Lambert, I. C., Colfax.
McCarty, M. T., Frankfort.
Robison, J. E., Geetingsville.
Sims, S. B., Frankfort.

CRAWFORD COUNTY.

OFFICERS.

F. R. Gobbel, President.
C. D. Luckett, Vice-President.
G. H. Abell, Sec.-Treas.
C. D. Luckett, Delegate.

CENSORS.

J. W. Walls.
L. E. Grant.
G. B. Hammond.

MEMBERS.

Gobbel, F. R., English.
Luckett, C. D., English.
Abell, G. H., Sulphur.
Walls, J. W., Eckerty.
Grant, L. E., Marengo.
Hammond, G. B., English.
Meyers, J., Alton.

DAVIESS COUNTY.

OFFICERS.

Geo. W. Willeford, President.
S. L. McPherson, Vice-Pres.
T. F. Spink, Sec.-Treas.
A. H. Faith, Delegate.

CENSORS.

C. H. Yenne.
A. H. Faith.
Henry Herr.

MEMBERS.

Anderson, J. W., Odon.
DeMotte, Jerome, Odon.
Elrod, S. B., Raglesville.
Faith, Abraham H., Washington.
Gers, Henry, Washington.
Herr, Henry, Washington.
Holder, Union H., Washington.
Hollingsworth, Ernest, Wash'gton.
Knapp, A. B., Washington.
May, Vance, Washington.
Millis, E. D., Plainville.
McKittrick, Ora K., Plainville.
McPherson, S. L., Montgomery.
Parks, James F., Cumback.
Rankin, T. B., Odon.
Scudder, Chas. P., Washington.
Smoot, D. Brooks, Washington.
Spink, T. F., Washington.
Tubbs, Geo. R., Alfordsville.
Wall, Chas. T., Washington.
Willeford, Geo. W., Washington.
Yenne, C. H., Washington.

DEARBORN COUNTY.

OFFICERS.

Geo. F. Smith, President.
David E. Johnson, Vice-Pres.
F. M. Mueller, Sec.-Treas.
H. H. Sutton, Delegate.

CENSORS.

W. C. Henry.
R. C. Bond.

MEMBERS.

Bond, Marc L., Aurora.
Bond, R. C., Aurora.
Birchfield, J. W., New Alsace.
Barclay, W. H., Farmers Retreat.
Cowen, Lewis C., Rising Sun.
Craig, T. E., Lawrenceburg.
Duncan, Wm. F., Manchester.
Elfers, John, Rising Sun.
Fagaly, A. T., Lawrenceburg.
Ford, O. P. M., Rising Sun.
Freeman, E. D., Osgood.
Harryman, S. E., Lawrenceburg.
Henry, W. C., Aurora.
Jaquith, O. S., Lawrenceburg.
Johnson, David E., Moores' Hill.
Ketcham, C. L., Guilford.
Libbert, E. J., Aurora.
Long, H. P., Hartford.
Marshal, Coglie, Aurora.
Mueller, F. M., Lawrenceburg.
Newforth, C., Sunman.
Pate, J. R., Milan.
Roney, David C., Milan.
Smith, Geo. F., Weisburg.
Suton, H. H., Aurora.
Treon, Jas. F., Aurora.
Emmerl, E. J., Lawrenceburg.

HONORARY.

Freeman, E. D., Osgood.
Pate, J. R., Milan.

DECATUR COUNTY.

OFFICERS.

John V. Schofield, President.
J. M. Wood, Vice-President.
D. F. Kercheval, Sec.-Treas.
G. S. Crawford, Delegate.

CENSORS.

G. S. Crawford.
D. L. Williams.
R. M. Thomas.

MEMBERS.

Schofield, J. V., Greensburg.
Wood, J. M., Greensburg.
Thomas, R. M., Greensburg.
Alexander, J. H., Greensburg.
Crawford, G. S., Clifty.
Thomas, Wm., Greensburg.
Kercheval, C. F., Greensburg.
Williams, C. L., Greensburg.
White, B. S., Greensburg.
Sanders, I. M., Adams.
Welch, Jno. A., Letts.
Welch, O. F., Westport.
Riley, J. H. S., Sr., Sardinia.
Burroughs, J. P., Westport.
Tremain, M. A., Adams.
Essex, H. L., Alert.
Gephart, R. T., Burney.

DEKALB COUNTY.

OFFICERS.

J. E. Showalter, President.
W. F. Shumaker, Vice-Pres.
Willard W. Swarts, Secretary.
John C. Baxter, Treasurer.

CENSORS.

D. J. Swarts.
W. H. Nusbaum.
F. M. Hines.

MEMBERS.

Acker, M. M., Butler.
Baxter, J. C., Auburn.
Bevier, Frank, Waterloo.
Braughton, F. A., Waterloo.
Buchtel, I. O., Auburn.
Casebeer, J. B., Auburn.
Darby, A. B., Waterloo.
Hines, F. M., Auburn.
Maris, A. J., Waterloo.
Matheny, T. G., Auburn.
Norred, W. A., Auburn.
Nusbaum, W. H., Auburn.
Per Due, C. R., Auburn.
Showalter, J. E., Waterloo.
Shumaker, W. F., Butler.
Stewart, C. S., Auburn.
Swarts, D. J., Auburn.
Swarts, Vesta M. W., Auburn.
Swarts, Willard W., Auburn.
Seabring, D. A., Auburn.

DELAWARE COUNTY.

OFFICERS.

H. R. Spickermon, President.
L. L. Ball, Vice-President.
U. G. Poland, Sec.-Treas.
G. W. Bucklin, Delegate.

CENSORS.

G. W. H. Kemper.
F. E. Hill.
W. W. Wadsworth.

MEMBERS.

Adams, B. O., Eaton.
Atkinson, J. M., Eaton.
Ball, L. L., Muncie.
Bell, J. N., New Burlington.
Brandon, W. S., Daleville.
Bucklin, G. W., Muncie.
Burcham, H. C., Albany.
Barnard, P. C., Oakville.
Cecil, A. A., Muncie.
Cowing, H. A., Muncie.
Cooper, A. M., Muncie.
Dunn, W. H., Gaston.
Fair, H. D., Muncie.
Franks, H. P., Muncie.
Frazer, Chas., Muncie.
Good, A. H., Selma.
Green, G. R., Muncie.
Hill, F. E., Muncie.
Jackson, F. G., Muncie.
Jump, S. G., Selma.
Kemper, A. T., Muncie.
Kemper, G. W. H., Muncie.
Kemper, W. W., Muncie.
Kilgore, Frank, Daleville.
Mann, E. B., Muncie.
Mansfield, T. J., Royerton.
Miller, C. E., Muncie.
Mitchell, W. P., Gaston.
Molloy, W. J., Muncie.
Norrel, J. W., Muncie.
Poland, U. G., Muncie.
Ried, S. M., Muncie.
Shaw, H. M., Gaston.
Smith, C. W., Selma
Spickermon, H. R., Muncie.
Shively, A. H., Yorktown.
Stover, C. J., Eaton.
Spurgeon, O. E., Muncie.
Trent, I. N., Muncie.
Tindal, E. F., Muncie.
Vanderburg, J. M., Albany.
Vinton, A. E., Muncie.
Wadsworth, W. W., Muncie.
Winans, H. M., Muncie.

DUBOIS COUNTY.

OFFICERS.

E. G. Lukemeyer, President.
L. B. Johnson, Vice-President.
C. R. Ramsbrok, Sec.-Treas.
E. J. Kempf, Delegate.

CENSORS.

A. G. Wollenmann.
Louis Lukemeyer.
J. P. Salb.

MEMBERS.

Wollenmann, A. G., Ferdinand.
Lukemeyer, E. G., Huntingburg.
Lukemeyer, Louis, Huntingburg.
Kempf, E. J., Jasper.
Salb, J. P., Jasper.
Ramsbrok, C. R., Huntingburg.
Johnson, L. B., Ireland.
Knapp, Victor, Ferdinand.
Kelso, U. G., Dubois.
Seneff, J. H., Crystal.
Stark, H. W., Holland.
Knapp, H. C., Haysville.
Whittingill, B. F., Ellsworth.

ELKHART COUNTY.

OFFICERS.

J. C. Fleming, President.
I. W. Short, Vice-President.
A. C. Yoder, Sec.-Treas.

CENSORS.

G. W. Spohn.
F. N. Dewey.
A. C. Yoder.

MEMBERS.

Ash, E. E., Goshen.
Adams, F. P., Elkhart.
Beckwell, I. J., Goshen.
Cook, J. A., Goshen.
Cummings, S. M., Elkhart.
Dewey, F. N., Elkhart.
Dutrow, C. E., Bristol.
Eckelman, M. M., Elkhart.
Eckelman, F. C., Elkhart.
Eisenbeiss, C. M., Elkhart.
Edwards,, S. A., Goshen.
Farver, M. A., Middlebury.
Fisher, A. L., Elkhart.
Fleming, J. C., Elkhart.
Frink, C. W., Elkhart.
Goodrich, C. D., Elkhart.
Goebel, Wm., Elkhart.
Haggerty, R. I., Elkhart.
Hall, H. M., Millersburg.
Hoopingarner, G. B., Elkhart.
Hauenstein, G. W., Elkhart.
Ihrig, F. M., Goshen.
Irwin, A. J., Goshen.
Kuhn, B. F., Elkhart.
Kistner, J. W., Elkhart.
Lockwood, R. S., Elkhart.
Mumaw, H. A., Elkhart.
Miller, D. L., Goshen.
Murphy, R. M., Elkhart.
Neal, W. A., Elkhart.
Price, M. D., Nappanee.
Price, W. A., Nappanee.
Planck, E. A., Union, Michigan.
Pounder, Malcolm, Elkhart.
Rieman, Wm. H., Millersburg.
Sensenich, A. S., Wakarusa.
Short, I. W., Elkhart.
Snapp, J. A., Goshen.
Spohn, G. W., Elkhart.
Teters, B. F., Middlebury.
Thomas, W. H., Elkhart.
Washburne, G. F., Elkhart.
Work, J. A., Elkhart.
Werner, J. F., Elkhart.
Yoder, A. C., Goshen.
Zinn, G. E., Elkhart.

FAYETTE COUNTY.

OFFICERS.

E. Derbyshire, President.
Jno. E. Chitwood, Vice-Pres.
Jos. R. Mountain, Sec.-Treas.
J. R. Mountain, Delegate.

CENSORS.

Geo. VanPelt.
F. J. Spilman.
S. N. Hamilton.

MEMBERS.

Ambrose, U. C., Lyons Station.
Chitwood, Jno. E., Connersville.
Clark, J. H., Connersville.
Dale, Omar E., Alquina.
Derbyshire, E., Connersville.
Dillman, Lurton D., Connersville.
Elliott, R. H., Connersville.
Gordin, S. E., Alquina.
Hamilton, S. N., Connersville.
Hamilton, E. Everett, Connersville.
Lamberson, Harry, Connersville.
Mountain, Joseph R., Connersville.
Spilman, F. J., Connersville.
Sipe, R. W., Orange.
VanPelt, Geo. F., Connersville.

FLOYD COUNTY.

OFFICERS.

H. S. Wolfe, President.
Wm. P. Tebault, Vice-Pres.
Austin Funk, Sec.-Treas.
E. P. Easley, Delegate.

CENSORS.

W. C. McIntyre.
E. P. Easley.
G. H. Cannon.

MEMBERS.

Bird, J. E., New Albany.
Cook, C. P., New Albany.
Cannon, G. H., New Albany.
Davis, D. F., New Albany.
Easley, E. P., New Albany.
Funk, Austin, New Albany.
Garey, Dumont, New Albany.
Hazelwood, John, New Albany.
Hazelwood, F. W., New Albany.
Knoefel, August, New Albany.
Leach, W. J., New Albany.
McKamy, Anna, New Albany.
Moore, Wm., New Albany.
Ralston, A. H., New Albany.
Rutherford, R. S., New Albany.
Sigmon, E. L., New Albany.
Shacklett, W. B., New Albany.
Starr, W. L., New Albany.
Tebault, W. P., New Albany.
Weathers, J. F., New Albany.
Wiliox, F. H., New Albany.
Winstandley, W. C., New Albany.
Wolfe, H. S., New Albany.
Davis, C. P., Galena.
Mitchell, F. A., New Albany.
Neat, T. C., New Albany.
Lemon, J. H., New Albany.
Richards, Wm. R., New Albany.
Wray, Jno. T., New Albany.

FOUNTAIN COUNTY.

OFFICERS.

Marshall Petet, President.
Charles H. Ludlow, Vice-Pres.
George Rowland, Sec.-Treas.
George Rowland, Delegate.

CENSORS.

F. A. Shoaf.
Chas. J. Finney.

MEMBERS.

Armstrong, L. P., Newtown.
Evans, John M., Mellott.
Finney, Charles J., Attica.
Henderson, J. T., Covington.
Mock, J. W., Covington.
Myers, C. L., Covington.
Pugh, F. H., Williamsport.
Rowland, George, Covington.
Spining, A. L., Covington.
Shoaf, F. A., Veedersburg.
Ludlow, Chas. H., Covington.
Ross, W. H., Veedersburg.
Pearlman, Samuel, Stone Bluff.
Petet, Marshall, Veedersburg.
Dinsmore, Walter H., Kramer.
Sparks, Joseph Tyndall, Yeddo.
Walter, F. J., Kramer.

FRANKLIN COUNTY.

OFFICERS.

Irvin O. Allen, President.
Calvin Carter, Sec.-Treas.
Calvin Carter, Delegate.

CENSORS.

John M. Linegar.
Jno. W. MacCammon.

MEMBERS.

Allen, Irvin, O., Metamora.
Carter, Calvin, Brookville.
Carter, Laura, Boston, Mass.
Linegar, John M., Fairfield.
MacCammon, Jno. W., Laurel.
Forry, Benj. F., Bath.
Gregory, Henry, Laurel.

FULTON COUNTY.

OFFICERS.

J. M. Ward, President.
A. Johnston, Vice-President.
G. E. Hoffman, Sec.-Treas.
C. J. Loring, Delegate.

CENSORS.

A. Armstrong.
A. Brown.
M. O. King.

MEMBERS.

Ward, J. M., Kewanna.
Hoffman, G. E., Rochester.
Loring, C. J., Rochester.
Brown, Archibald, Rochester.
Johnston, A., Akron.
Runnells, J. Newton, Rochester.
Slonaker, C. L., Leitersford.
Shafer, W. S., Rochester.
Armstrong, A., Kewanna.
Stinson, A. E., Athens.
Gould, Vernon, Rochester.
King, M. O., Rochester.
Hosman, W. E., Akron.
Carpender, W. P., Akron.

HONORARY.

Gould, Vernon, Rochester.
Kelsey, William, Monterey.

GIBSON COUNTY.

OFFICERS.

W. W. Blair, President.
M. L. Arthur, Vive-President.
A. R. Burton, Sec.-Treas.
M. P. Hollingsworth, Delegate.

CENSORS.

F. B. Kurtz.
M. P. Hollingsworth.
G. C. Kendle.

MEMBERS.

Anderson, R. S., Princeton.
Arthur, M. L., Patoka.
Burton, A. R., Princeton.
Blair, W. W., Princeton.
Blair, Frank, Princeton.
Clark, J. H., Princeton.
Cushaman, R. A., Princeton.
Hollingsworth, M. P., Princeton.
Clark, J. I., Owensville.
Kendle, G. C., Princeton.
Morris, W. F., Fort Branch.
McGowan, John W., Oakland City.
Mason, Geo. C., Oakland City.
Montgomery, Martin, Owensville.
Maxam, F. H., Princeton.
Morris, J. L., Kings.
Patten, J. C.,* Francisco.
Strickland, Geo., Francisco.
Swan, D. H., Francisco.
Zimmerman, J., Lynnville.

* Deceased.

GRANT COUNTY.

OFFICERS.

J. W. Patterson, President.
Burnham C. Dale, Secretary.
M. T. Shively, Treasurer.
Wm. Flynn, Delegate.

CENSORS.

L. H. Conley.
A. J. Dooley.

MEMBERS.

Barns, W. C., Marion.
Conley, L. H., Gas City.
Corey, L. J., Van Buren.
Cronkhite, C. C., Marion.
Crumrine, I. S. J., Landess.
Dale, B. C., Marion.
Dooley, A. J., Marion.
Daniels, G. W., Sweetser.
Daniels, Geo., Marion.
Fankboner, W. A., Marion.
Flynn, Wm., Marion.
Francis, W. R., Marion.
Henley, A., Fairmount.
Jeffries, H. S., Upland.
Johnson, J. E., Marion.
Kimball, T. C., Marion.
Matteson, D. E., Marion.
McKay, J. D., Marion.
McQuown, O. W., Marion.
Overman, C. J., Marion.
Patterson, J. W., Fairmount.
Shively, M. T., Marion.
Stout, O. L., Upland.
Thompson, W. H., Matthews.
Whitson, E. M., Jonesboro.
Wharton, W. L., Matthews.

HONORARY.

Alexander, W. P., Camden.
Hollis, Ella, Hartford City.
Hollis, Samuel, Hartford City.
Kimball, A. D., Nat. Mil. Home.
Miller, Harry, Nat. Mil. Home.
Williams, Lewis, Marion.

GREENE COUNTY.

OFFICERS.

J. E. Talbott, President.
W. H. Cole, Secretary.

CENSORS.

E. T. Sherwood.
W. R. Cravens.
W. H. Cole.

MEMBERS.

Cravens, W. R., Bloomfield.
Cole, W. H., Switz City.
Cravens, E. R., Linton.
Cook, P. M., Salsbury.
Hyde, L. A., Linton.
Mallett, C. D., Switz City.
Quillen, S. N., Linton.
Sherwood, B. M., Linton.
Sherwood, E. T., Linton.
Talbott, J. E., Linton.
Rose, B. A., Linton.
Thayer, M. N., Linton.

HAMILTON COUNTY.

OFFICERS.

C. C. Ray, President.
F. C. Hershey, Vice-Pres.
E. E. Wishard, Sec.-Treas.

CENSORS.

E. C. Loehr.
J. B. Young.
S. J. Baldwin.

MEMBERS.

Axline, J. A., Noblesville.
Baldwin, S. J., Hortonville.
Dove, S. C., Westfield.
Fodrea, Z. H., Westfield.
Graham, W. B., Noblesville.
Haworth, M. C., Noblesville.
Hershey, K. C., Carmel.
Hershey, F. C., Carmel.
Loehr, E. C., Noblesville.
Parr, J. N., Jolietville.
Hicks, J. L., Arcadia.
Ray, C. C., Arcadia.
Tomlinson, C. H., Cicero.
Tucker, F. A., Noblesville.
Tucker, A. R., Noblesville.
Truitt, F. L., Noblesville.
Young, J. B., Cicero.
Wishard, E. E., Noblesville.

HANCOCK COUNTY.

OFFICERS.

E. R. Sisson, President.
Oscar Heller, Vice-President.
C. K. Bruner, Sec.-Treas.
N. P. Howard, Delegate.

CENSORS.

James A. Comstock.
W. R. King.
N. P. Howard.

MEMBERS.

Barnes, C. A., Greenfield.
Bruner, C. K., Greenfield.
Bruner, Mary L., Greenfield.
Comstock, James A., Greenfield.
Cory, J. D., McCordsville.
Ferrel, J. E., Eden.
Gibbs, Charles Milo, Greenfield.
Heller, Oscar, Greenfield.
Howard, Noble P., Greenfield.
Justice, Wm. A., Greenfield.
King, Warren R., Greenfield.
Larimore, J. M., Greenfield.
Selman, John W., Greenfield.
Selman, Frank W., Greenfield.
Sisson, Ernest R., Maxwell.
Slocum, Stewart, Fortville.

HARRISON COUNTY.

OFFICERS.

Wm. Moore, President.
Z. T. Funk, Vice-President.
F. E. Wolfe, Sec.-Treas.
Z. C. Wolfe, Delegate.

CENSORS.

Wm. Daniel.
G. F. Martin.
J. C. Bottorff.

MEMBERS.

Funk, Z. T., Corydon.
Wolfe, Z. C., Corydon.
Wolfe, F. E., Lanesville.
Daniel, Wm., Corydon.
Martin, G. F., Corydon.
Bottorff, J. C., Corydon.
Fetzer, J. E., Corydon.
Habermal, Clara L., Corydon.
Winders, L. C., Elizabeth.
Reader, W. H., New Amsterdam.

HENDRICKS COUNTY.

OFFICERS.

D. M. Reynolds, President.
Harry S. Osborn, Vice-Pres.
W. T. Lawson, Sec.-Treas.
William H. Terrell, Delegate.

CENSORS.

John S. Ragan.
John A. Osborn.
Joel T. Barker.

MEMBERS.

Adams, Thomas J., North Salem.
Barker, Joel T., Danville.
Barker, Thomas R., Danville.
Carter, Amos, Plainfield.
Cooper, Ernest, Plainfield.
Davidson, A. W., Brownsburg.
Farabee, C. E., Danville.
Hoadley, W. J., Danville.
Hunt, Stephen, Plainfield.
Hunt, Tighlman, Plainfield.
Jessup, Maria Allen, Friendswood.
Jones, Rilus E., Clayton.
Johnson, O. B., Lizton.
Lawson, W. T., Danville.
Marsh, John L.,Brownsburg.
McClintock, Chas. W., Pittsboro.
Osborn, John A., New Winchester.
Osborn, Harry S., Pittsboro.
Parker, M. G., Danville.
Ragan, John S., Plainfield.
Reynolds, D. Monroe, Clayton.
Summers, H. C., Amo.
Smith, Thomas G., Brownsburg.
Terrell, W. H., Stilesville.
White, C. A., Danville.

HENRY COUNTY.

OFFICERS.

O. J. Gronendyke, President.
H. H. Koons, Vice-President.
S. C. Waters, Sec.-Treas.
S. C. Waters, Delegate.

CENSORS.

E. T. Mendenhall.
H. Benedict.
T. W. Gronendyke.

MEMBERS.

Andrews, George R., Mt. Summit.
Bartlett, C. G., Lewisville.
Boor, W. F., New Castle.
Butler, C. A., New Castle.
Benedict, H., Springport.
Crouse, Henry W., Knightstown.
Griest, H. W., New Castle.
Gronendyke, T. W., New Castle.

Gronendyke, O. J., New Castle.
Hess, F. C., Cadiz.
Hardesty, J. C., New Castle.
Hiatt, J. E., New Castle.
Koons, H. H., New Lisbon.
Kirk, E. E., Spiceland.
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Brayton, Nelson D., 330 N. Claypool Bldg.
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Davidson, W. R., 1205 Park.
Earp, Samuel E., 24½ Kentucky.
Eastman, Thomas B., 331 N. Del.
Eastman, J. Rilus, 331 N. Del.
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Foxworthy, Frank W., 115 E. New York.
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Groff, John H., Cumberland.
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Kratzer, E. F., Peru.
Ward, J. O., Peru.
Andrews, E. H., Peru.
Magruder, J. W., Peru.
Ridenour, D. C., Peru.
Bloomfield, E. M., Peru.
Boggs, M. M., Macy.
Helm, C. J., Peru.
Smith, A. F., Waupecong.
Wainscott, O. C., Peru.
Kimball, M. C., Converse.
Grainvold, E. H., Peru.
Yarling, J. E., Peru.
Peters, J. B., Macy.

MONROE COUNTY.

OFFICERS.

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Lucy W. Gardner, Vice-Pres.
C. E. Harris, Secretary.
G. F. Holland, Treasurer.
P. C. Holland, Delegate.

CENSORS.

O. F. Rogers.
W. N. Culmer.
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MEMBERS.

Harris, J. E., Bloomington.
Harris, C. E., Bloomington.
Lowder, L. T., Bloomington.
Culmer, W. N., Bloomington.
Baker, J. V., Harrodsburg.
Tourner, J. P., Bloomington.
Tourner, F. F., Bloomington.
Weir, C. T., Bloomington.
Ross, J. C., Bloomington.
Smith, Thurston, Bloomington.
Schaeffer, G. C., Bloomington.
Whetsell, L. E., Bloomington.
Wiltshire, J. W., Bloomington
Holland, P. C., Bloomington.
Holland, G. F., Bloomington.
Zaring, P. A., Bloomington.
Gardner, Lucy W., Bloomington.

MONTGOMERY COUNTY.

OFFICERS.

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F. M. Shonkwiler, Vice-Pres.
A. A. Swope, Sec.-Treas.
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CENSORS.

O. H. Jones.
S. L. Ensminger.
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MEMBERS.

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Batman, W. F., Ladoga.
Brown, A. L., Alamo.
Cowan, E. H., Crawfordsville.
Davidson, J. F., Crawfordsville.
Dennis, F. L., Crawfordsville.
Etter, J. R., Crawfordsville.
Ensminger, S. L., Crawfordsville.
Elliott, J. W., Lindon.
Griffith, M. J., Crawfordsville.
Griffith, T. J., Crawfordsville.
Green, H. E., Crawfordsville.
Gerard, R. H., Crawfordsville.
Hutchings, B. F., Crawfordsville.
Jones, O. H., Crawfordsville.
Ristine, W. H., Crawfordsville.
Sigmond, H. W., Crawfordsville.
Shonkwiler, T. M., New Market.
Swope, A. A., Crawfordsville.
Williams, G. T., Crawfordsville.
Keegan, E. W., Crawfordsville.
Allhands, F. D., Wingate.
Ball, T. Z., Waveland.
Price, E. O., Ladoga.

MORGAN COUNTY.

OFFICERS.

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W. E. Hendricks, Vice-Pres.
W. J. Sandy, Secretary.
G. B. Breedlove, Treasurer.
A. S. Tilford, Delegate.

CENSORS.

F. R. Maxwell.
Guy Seaton.
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MEMBERS.

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Sandy, W. J., Martinsville.
Hibbs, Irwin, Martinsville.
Maxwell, F. R., Martinsville.
Maxwell, J. H., Martinsville.
Henson, Theodore, Martinsville.
Tilford, A. S., Martinsville.
Seaton, Guy, Martinsville.
Brackney, M. F., Mooresville.
Breedlove, Geo. B., Brooklyn.
Monical, G. S., Martinsville.
Robinson, H. C., Martinsville.
Robinson, F. C., Martinsville.
Gravis, C. M., Martinsville.
Green, E. V., Martinsville.
Lindley, C. M., Brooklyn.
Spoor, J. S., Brooklyn.
Reagan, A. W., Mooresville.
Hylton, A. J., Mooresville.
Van Sant, W. P., Brooklyn.
Wharton, J. O., Exchange.
Seaton, Chas., Martinsville.
Magenheimer, V. A., Waverly.
Thompson, Wm. L., Mooresville.
Sweet, E. M., Martinsville.
Kennedy, D. P., Martinsville.
Bradley, J. S., Hall.
Brown, A. S., Paragon.
Sweet, Otis, Martinsville.
Williamson, R. B., Paragon.
Hartsock, W. B., Waverly.
Kennedy, John, Paragon.

NOBLE COUNTY.

OFFICERS.

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N. J. Shook, Secretary.
J. L. Gilbert, Delegate.

CENSORS.

S. W. Lemmon.
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MEMBERS.

Black, F. W., Ligonier.
Bowker, J. J., Laotto.
Carver, W. T., Albion.
Depauw, E. W., Wolf Lake.
Franks, W. H., Ligonier.
Gilbert, Joseph L., Kendallville.
Goodwin, C. B., Kendallville.
Greene, Thomas C., Albion.
Greene, W. T., Albion.
Hayes, John W., Albion.
Gardner, C. A., Kendallville.
Johnson, W. A., Wawaka.
Knepper, E. W., Albion.
Lemmon, S. W., Albion.
Luckey, J. E., Wolf Lake.
Maloney, F. C., Avilla.
Miller, B. E., Albion.
Mitchel, W. K., Ligonier.
Morr, J. W., Albion.
Nye, J. H., Cromwell.
Shaw, S. T., Kimmel.
Seymore, C. A., Wawaka.
Shoab, W. A., Ligonier.
Shoop, N. J., Kendallville.
Tucker, H. G., Cromwell.
Veasey, W. M., Avilla.
Willian, W. S., Kendallville.
Moore, N. B., Merriam.
Dunlap, Robert, Kendallville.

ORANGE COUNTY.

OFFICERS.

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Laban Lindley, Vice-Pres.
R. E. Baker, Sec.-Treas.
E. D. Laughlin, Delegate.

CENSORS.

S. L. Lingle.
O. H. Stewart.
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MEMBERS.

Baker, R. E., Orleans.
Boyd, C. E., West Baden.
Boyd, C. L., Paoli.
Dillinger, J. R., French Lick.
Hunt, F. P., Leipsic.
Hoggatt, W. W., French Lick.
Howard, J. L., West Baden.
Laughlin, E. D., Orleans.
Lindley, Laban, Paoli.
Lingle, S. L., Paoli.
Lindenbeger, Irwin, French Lick.
Maris, J. I., Paoli.
Patton, W. H., Orleans.
Ritter, T. B., Orleans.
Ritter, H. O., Orangeville.
Stewart, O. H., Orleans.
Sloan, W. W., French Lick.
Teaford, S. F., Paoli.
Tolliver, J. A., French Lick.
Hassenmiller, M., West Baden.

OWEN COUNTY.

OFFICERS.

Jacob Coble, President.
H. A. Fox, Vice-Pres.
Allen Pierson, Sec.-Treas.
Allen Pierson, Delegate.

CENSORS.

N. D. Cox.
Wilford Hickam.
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Coble, Jacob, Spencer.
Cox, Nathaniel D., Spencer.
Davis, William M., Coal City.
Fox, Henry A., Gosport.
Fisher, Benjamin T., Spencer.
Gantz, Thomas, Freedom.
Hazel, James T., Freedom.
Hickam, Wilford, Spencer.
Holtzman, Rice C., Stinesville.
Jones, Jesse M., Cataract.
Kennedy, Albert C., Patricksburg.
McDonald, David H., Quincy.
Maddox, W. B. S., Vandalia.
Osgood, Howard G., Gosport.
Pierson, Allen, Spencer.
Pritchard, Caleb A., Gosport.
Richards, Samuel D., Patricksburg.
Richards, Renos H., Patricksburg.
Sloan, John N., Spencer.
Stucky, John M., Gosport.
Stucky, Frederick V., Gosport.
Wiles, Frank M., Indianapolis.
Williams, Franklin A., Cuba.
White, Claudius H., Cataract.
Yocum, Boaz, Coal City.

PARKE COUNTY.

OFFICERS.

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W. H. Gillum, Secretary.
C. C. Morris, Treasurer.

MEMBERS.

Caplinger, C. A., Wallace.
Farver, G. W., Montezuma.
Gillum, W. H., Rockville.
Goss, M., Rockville.
Lynch, J. Y., Rosedale.
Martin, A., Bellmore.
Morris, C. C., Rockville.
Norman, J. I., Parkeville.
Rogers, H. C., Rockville.

PERRY COUNTY.

OFFICERS.

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C. H. Mason, Vice-Pres.
E. R. Snyder, Secretary.
C. M. Brucker, Treasurer.
C. H. Mason, Delegate.

CENSORS.

Wm. Cluthie.
C. E. Cox.
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Brucker, C. M., Tell City.
Mason, Chas. H., Tell City.
Muelchi, Wm., Tell City.
Cramm, C. J., Fulda.
Mayfield, A. L., Bristow.
Hendershot, C. T., Cannelton.
Snyder, E. R., Troy.
Hargis, W. T., Derby.
Taylor, J. E., Leopold.
Hendrickson, A. M. D., Magnet.
Bennett, J. B., Cannelton.
Cox, C. E., Cannelton.
Dome, D. C., Troy.
Lee, J. H., Rome.
Wedding, M. F., Rome.
Miller, H. L., Leopold.
White, David, Tobinsport.
Weiss, H. G., Lamar.
Cluthie, Wm., Tell City.

PIKE COUNTY.

OFFICERS.

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E. S. Imel, Vice-Pres.
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G. L. Ireland, Delegate.

CENSORS.

J. F. Kime.
W. M. Hunter.
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MEMBERS.

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Coleman, J. W., Petersburg.
Kime, J. F., Petersburg.
Basinger, T. W., Petersburg.
Byers, O. A., Petersburg.
Hunter, W. M., Petersburg.
Bethel, W. J., Winslow.
Taylor, E. C., Winslow.
Ireland, G. L., Winslow.
Taylor, D. E., Velpen.
Abbott, Clarence, Otwell.
Logan, A. R., Algiers.

PORTER COUNTY.

OFFICERS.

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S. J. Young, Sec.-Treas.

CENSORS.

R. D. Blount.
D. J. Loring.
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MEMBERS.

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Evans, H. M., Valparaiso.
Ball, E. J., Valparaiso.
Blount, R. D., Valparaiso.
Letherman, A. P., Valparaiso.
Loring, D. J., Valparaiso.
Young, S. J., Valparaiso.
Noland, P. D., Kouts.
Crawford, E. T. W., Hanna.
Short, R. B., Union Mills.
Leeson, G. M., Wanatah.
Kelley, J. N., Westville.
Warren, C. L., Chesterton.
Wiltfong, C. O., Chesterton.
Dobbins, A. O., Wheeler.
Powell, E. H., Valparaiso.
Vickery, C. R., Valparaiso.

EXPELLED.

Sassaman, F. W., Valparaiso.

POSEY COUNTY.

OFFICERS.

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F. L. Stallings, Sec.-Treas.

CENSORS.

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Wm. Holton.
C. H. Fullenwider.

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Stallings, F. L., Caborn.
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Arburn, Chas., Wadesville.
Doerr, J. E., Mt. Vernon.
Fullenwider, C. H., Mt. Vernon.
Hensler, Ernest C., Howell R. R.
Rawlings, S. C., New Harmony.
Wilson, T. W., New Harmony.
Holton, Wm., New Harmony.
Cremeans, W. C., Mt. Vernon.
Runcie, G. H., Poseyville.
Glaze, J. M., New Harmony.
Whiting, U. G., Wadesville.
Ramsey, D. C., Mt. Vernon.
Hicks, C., Mt. Vernon.
Emmick, T. C., Mt. Vernon.
Wealch, D. W., Mt. Vernon.
Sugg, H. H., Mt. Vernon.
Welborn, G. W., Stewartsville.
Hall, T. J., Grafton.
Barrett, C. P., Oliver.
Flucks, Carl, St. Wendell.
Cox, J. B., Mt. Vernon.

HONORARY.

Kelley, F. H., New Harmony.

PULASKI COUNTY.

OFFICERS.

William Kelsey, President.
J. J. Thomas, Vice-President.
W. H. Thompson, Sec.-Treas.
G. W. Thompson, Delegate.

CENSORS.

H. C. Stevens.
A. H. Smith.
C. W. Moss.

MEMBERS.

Thompson, G. W., Winamac.
Thompson, W. H., Winamac.
Thomas, J. J., Winamac.
Moss, D. F., Winamac.
Moss, W. C., Winamac.
Kelsey, William, Monterey.
Stevens, H. C., Star City.
Smith, A. H., Star City.

PUTNAM COUNTY.

OFFICERS.

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A. H. Horn, Vice-President.
J. M. King, Secretary.
L. M. Hanna, Treasurer.

CENSORS.

J. V. Bastin.
W. R. Hutcheson.
C. C. Collins.

MEMBERS.

Bastin, J. V., Greencastle.
Collins, C. C., Roachdale.
Cully, John F., Bainbridge.
Evans, E. B., Greencastle.
Gillespie, J. T., Reelsville.
Hanna, L. M., Greencastle.
Hawkins, E., Greencastle.
Horn, A. H., Putnamville.
Hutcheson, W. R., Greencastle.
King, J. M., Greencastle.
Mullinix, P., Cloverdale.
Preston, J. L., Greencastle.
McGaugher, Wm., Greencastle.
Stroube, C. N., New Maysville.
Tucker, W. W., Greencastle.
Zaring, C. T., Greencastle.
Hope, C. F., Coatsville.

RANDOLPH COUNTY.

OFFICERS.

G. Reynard, President.
B. S. Hunt, Sec.-Treas.

MEMBERS.

Chenoweth, N. T., Windsor.
Chenoweth, F. A., Winchester.
Coffin, A., Carlos City.
Cromer, L. G., Union City.
Davis, L. N. Farmland.
Blair, J. S., Lynn.
Cox, C. R., Lynn.
Current, O. E., Farmland.
Evans, J. J., Winchester.
Farquhar, L. H.,* Ridgeville.
Able, O. E., Trenton.
Hunt, B. S., Winchester.
Moroney, J. H., Winchester.
McCormick, W. D., Modoc.
Markle, G. C., Winchester.
Rogers, A. G., Parker City.
Rine, E. W., Winchester.
Spitler, Chas., Saratoga.
Reynard, G., Union City.
Wiggins, D. S., Losantville.
Trenary, D. F., Modoc.

* Deceased.

RIPLEY COUNTY.

OFFICERS.

E. D. Freeman, President.
J. N. Hess, Vice-President.
F. M. Olmstead, Sec.-Treas.
L. T. Cox, Delegate.

CENSORS.

R. T. Olmstead.
E. D. Freeman.
J N. Hess.

MEMBERS.

Freeman, E. D., Osgood.
Hess, J. N., New Marion.
Olmsted, R. T., Versailles.
Coomes, M. J., Versailles.
Jones, J. G., Versailles.
Townsend, R. C., Osgood.
Olmsted, F. M., Versailles.
Cox, L. T., Napoleon.
Beckett, G. A., Benham.
Miller, Albert, Holton.
Pate, J. R., Milan.
Kremer, F. M., St. Magdalene.
Cox, J. G., Holton.
Hicks, J. C., Napoleon.
Pinkston, J. M., Milan.

RUSH COUNTY.

OFFICERS.

L. R. Hudleson, President.
S. C. Thomas, Vice-President.
W. S. Coleman, Sec.-Treas.
Lot Green, Delegate.

CENSORS.

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J. A. Sipe.
J. T. Paxton.

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Coleman, W. S., Rushville.
Cregor, F. W., Carthage.
Green, Lot, Rushville.
Hackleman, F. G., Rushville.
Hoagland, C. S., Milroy.
Hudleson, L. R., Milroy.
Logan, H. V., New Salem.
Metcalf, H. P., Andersonville.
Parsons, C. H., Rushville.
Paxton, J. T., Glenwood.
Rea, C. S., Falmouth.
Sexton, J. C., Rushville.
Sipe, J. A., Carthage.
Smith, W. H., Rushville.
Smith, W. C., Rushville.
Smith, I. F., Arlington.
Thomas, S. C., Milroy.
VanOsdol, D. D., Rushville.
Wooden, E. I., Rushville.

ST. JOSEPH COUNTY.

OFFICERS.

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Dudley Fulton, Vice-Pres.
H. F. Mitchell, Secretary.
C. M. Butterworth, Treasurer.
J. B. Berteling, Delegate.

CENSORS.

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F. M. Sawyer.
J. H. Cannon.

MEMBERS.

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Berteling, J. B., South Bend.
Brown, J. R., Sumption Prairie.
Butterworth, C. M., South Bend.
Borley, W. E., Mishawaka.
Borley, E. R., South Bend.
Cannon, J. H., South Bend.
Daugherty, C. A., South Bend.
Dean, E. R., South Bend.
Dugdale, R. B., South Bend.
Eastman, F. P., South Bend.
Fink, H. A., South Bend.
Fulton, Dudley, South Bend.
Hager, W. A., South Bend.
Hansel, C. A., Lakeville.
Hill, J. W., South Bend.
Hill, G. S., South Bend.
Lent, E. J., South Bend.
Milligan, J. W., South Bend.
Miranda, W. F., Walkerton.
Mitchell, H. F., South Bend.
Moore, E. P., South Bend.
Montgomery, H. L., South Bend.
Sawyer, F. M., South Bend.
Stoltz, Chas., South Bend.
Stroupe, C. C., Mishawaka.
Terry, C. C., South Bend.
Varier, J. A., South Bend.
Wickham, W. A., South Bend.
Wegner, W. G., South Bend.
Wood, W. F., Mishawaka.
Wrynhart, R. T., South Bend.
Dresch, C. A., Mishawaka.
Zaliski, Jos. P., South Bend.

McNamara, D. W., South Bend.
Scherfer, J. F., South Bend.
Kaple, J. D., South Bend.
Mills, W. F., South Bend.
Von Baranda, Oscar, South Bend.
Proudfit, Louis, Osceola.
Holtzendorff, H., Mishawaka.
Greene, J. B., Mishawaka.
Lockwood, F. W., South Bend.

SCOTT COUNTY.

OFFICERS.

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T. H. Close, Vice-President.
T. E. Biery, Sec.-Treas.
W. L. McLain, Delegate.

CENSORS.

O. C. Murphy.
Geo. F. Cline.
J. A. Sarver.

MEMBERS.

Close, T. H., Scottsburg.
Cline, Geo. F., Scottsburg.
McClain, Levi M., Scottsburg.
Murphy, O. C., Scottsburg.
McLaine, W. L., Scottsburg.
Biery, T. E., Scottsburg.
Sarver, J. A., Scottsburg.
Lathrop, A. A., Lexington.
Kendall, Arnold P., Austin.

SHELBY COUNTY.

OFFICERS.

Frank E. Ray, President.
Willard Parrish, Vice-Pres.
Bayard G. Keeney, Sec.-Treas.

CENSORS.

M. Drake.
J. Bowlby.
S. L. Strickler.

MEMBERS.

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Campbell, Frank, Shelbyville.
Drake, Morris, Shelbyville.
Strickler, S. L., Boggstown.
Jenkins, J. R., Boggstown.
Inlow, I. W., Blue Ridge.
Bowlby, Joseph, Shelbyville.
Randolph, D. F., Waldron.
Parrish, J. W., Shelbyville.
Phares, H. E., Shelbyville.
Keeney, B. G., Shelbyville.
Green, T. G., Shelbyville.
Cook, Chas. I., Gwynsville.
Boone, B. H., Boggstown.
McFadden, W. G., Shelbyville.
Kennedy, W. H., Shelbyville.
Green, W. F., Shelbyville.
Connelly, H. M., Shelbyville.
Estes, J. W., Shelbyville.
Kennedy, Samuel, Shelbyville.
Kennedy, T. C., Shelbyville.
Keeling, J. E., Waldron.
Hess, M. M., Morristown.
Patten, V. C., Morristown.
Pettigrew, D. A., Flat Rock.
Perry, Chas., Lewis Creek.
Rubush, T. R., London.
Snider, J. W., Fairland.
Snider, Warren, Fairland.
Inlow, G. I., Blue Ridge.

SPENCER COUNTY.

OFFICERS.

J. C. Jolly, President.
W. T. Logsdon, Vice-Pres.
Hardin S. Dome, Sec.-Treas.

CENSORS.

W. T. Logsdon.
J. M. Dailey.
C. H. Adye.

MEMBERS.

Jolly, J. C., Lake.
Logsdon, W. T., Rockport.
Adye, C. H., Patronville.
Dailey, J. M., Rockport.
Baumgaertner, O., Rockport.
Dome, H. S., Eureka.
Harter, Harry, Newtonville.
Harrom, G. W., Hatfield.
Gwaltney, S. P., Midway.

STARKE COUNTY.

OFFICERS.

L. D. Glazebrook, President.
P. O. Englerth, Vice-Pres.
S. I. Brown, Sec.-Treas.
S. I. Brown, Delegate.

MEMBERS.

Wright, M. R., Knox.
Jones, H., Ober.
Englerth, P. O., North Judson.
Brown, S. I., Knox.
Jones, P. W., Ober.

STEUBEN COUNTY.

OFFICERS.

H. D. Wood, President.
F. B. Humphrey, Vice-Pres.
T. J. Creel, Sec.-Treas.
T. J. Creel, Delegate.

CENSORS.

T. F. Wood.
C. W. Goodale.
J. F. Cameron.

MEMBERS.

Cameron, J. F., Hamilton.
Creel, T. J., Angola.
Cunningham, H. L., Salem Center.
Humphrey, F. B., Angola.
Kimmel, A. J., Hudson.
Lane, W. H., Angola.
Sutherland, P. N., Angola.
Waller, W. H., Angola.
Williams, T. B., Angola.
Wood, T. F., Angola.
Wood, H. D., Angola.
Wood, W. W., Angola.
Ritter, Mary, Angola.

SULLIVAN COUNTY.

OFFICERS.

E. D. Thixtun, President.
A. Cushman, Vice-President.
C. F. Briggs, Sec.-Treas.

MEMBERS.

Amerman, C. E., Dugger.
Bedwell, T. S., Dugger.
Briggs, C. F., Sullivan.
Caffee, A. H., Hymera.
Corbin, E. M., Sullivan.
Coulson, S. B., Jackson Hill.
Crowder, J. R., Sullivan.
Crowder, R. H., Sullivan.
Durham, J. L., Graysville.
Edwards, C. H., Sullivan.
Freeman, Joseph, Sullivan.
Jackson, J. H., Pleasantville.
Lisman, J. W., New Lebanon.
Maple, J. B., Shelburn.
Miles, James, Merom.
McConnell, J. E., Carlisle.
Parker, J. J., Merom.
Parker, O. O., Merom.
Thixtun, E. D., Sullivan.
Thompson, W. N., Sullivan.
Thralls, C. W., Hymera.
Thralls, R. T., Hymera.
Vancleave, R. H., Farmersburg.
Walters, C. R., Paxton.
Yager, E. J., Graysville.
Cushman, A., Graysville.
Pirtle, G. W., Carlisle.
Neff, J. H., Fairbanks.

SWITZERLAND COUNTY.

OFFICERS.

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J. P. Ward, Vice-President.
Hannah C. Rous, Sec.-Treas.

MEMBERS.

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Copeland, G. W., Moorefield.
Culbertson, Scott, Vevay.
Douglas, Dilver E., E. Enterprise.
Greenleaf, H. A., Markland.
Haydon, David N., Vevay.
Loomis, Chas., Florence.
Rous, Hannah C., Vevay.
Shaddy, Jno. H., Vevay.
Thiebaud, Hugh M., Vevay.
Ward, Jno. P., Vevay.
Woolen, Levin J., Vevay.

TIPPECANOE COUNTY.

OFFICERS.

Walter H. Peters, President.
J. C. Morrison, Vice-Pres.
Ernest S. Baker, Secretary.
Chas. Hupe, Treasurer.
J. C. Webster, Delegate.

CENSORS.

J. D. Hillis.
C. C. Driscoll.
R. S. Tea.

MEMBERS.

Baker, Ernest S., Lafayette.
Baker, Erasmus S., West Point.
Beasley, Geo. F., Lafayette.
Bitting, A. W., West Lafayette.
Campbell, Wm. S., West Point.
Davidson, E. C., Lafayette.
Driscoll, C. C., Lafayette.
Hillis, J. D., Lafayette.
Hopper, M. S., Lafayette.
Hupe, Chas., Lafayette.
Irwin, L. M.,* Lafayette.
Keiper, Geo. F., Lafayette.
Lairy, M. M., Lafayette.
Levering, Guy P., Lafayette.
McMahan, Adah, Lafayette.
Mitchell, Josephine M., Lafayette.
Moffit, Wm., West Lafayette.
Morrison, J. S., Lafayette.
Nesbitt, Wm. S., Monitor.
Peters, W. H., Lafayette.
Reser, Wm. M., Lafayette.
Revis, Geo. F., Lafayette.
Tea, R. S., Lafayette.
Thompson, Frank, Lafayette.
Throckmorton, G. K., Lafayette.
Walker, Wm. S., Lafayette.
Webster, J. C., Lafayette.
Westfall, A. B., Lafayette.
Wetherill, R. B., Lafayette.
Wilson, M. C., Lafayette.
Washburn, S. S., Lafayette.
Schulz, Herman S., Lafayette.

HONORARY.

Burrage, S., West Lafayette.
Coulter, Stanley, Lafayette.

* Deceased.

TIPTON COUNTY.

OFFICERS.

H. G. Read, President.
Wm. E. McKee, Vice-Pres.
A. W. Gifford, Sec.-Treas.
H. E. Grishaw, Delegate.

CENSORS.

T. W. Longfellow.
H. E. Grishaw.
M. V. B. Newcomer.

MEMBERS.

Cochran, T. C., Sharpsville.
Chance, B. V., Windfall.
Dickey, A. S., Tipton.
Doan, N. W., New Lancaster.
Grishaw, H. E., Tipton.
Gifford, A. W., Tipton.
Hinkle, E. I., Goldsmith.
Longfellow, T. W., Tipton.
McKee, W. E., Tipton.
Newcomer, M. V. B., Tipton.
Ploughe, M. T., Kempton.
Read, H. G., Tipton.
Rubush, D. P.,* Sharpsville.

* Deceased.

UNION COUNTY.

OFFICERS.

J. E. Morris, President.
E. R. Beard, Sec.-Treas.
Garrett Pigman, Delegate.

MEMBERS.

Morris, J. E., Liberty.
Pigman, Garrett, Liberty.
Kell, S. D., Liberty.
Beard, E. R., Liberty.

VANDERBURGH COUNTY.

OFFICERS.

F. L. Davis, President.
Geo. F. Greenleaf, Vice-Pres.
W. R. Davidson, Sec.-Treas.
A. M. Hayden, Delegate.

CENSORS.

Edwin Walker.
G. W. Varner.
B. W. L. Floyd.

MEMBERS.

Achilles, F. W., Evansville.
Bacon, C. F., Evansville.
Baughman, J. N., Evansville.
Begley, B. W., Evansville.
Binkley, J. F., Evansville.
Bitz, J. F., Evansville.
Boyden, C. F., Evansville.
Brose, L. D., Evansville.
Bryan, T. L., Evansville.
Busse, E. P., Evansville.
Cain, D. B., Evansville.
Cantrall, F. A., Evansville.
Cleveland, W. F., Evansville.
Coleman, W. H., Evansville.
Cottingham, I. E., Evansville.
Cox D. A., Howell.
Davidson, W. R., Evansville.
Davis, F. L., Evansville.
Duddenhausen, W. C., Evansville.
Eichel, S. J., Evansville.
Field, W. H., Evansville.
Frick, H. C., Evansville.
Fritsch, W. A., Evansville.
Gilbert, W. H., Evansville.
Glover, J. F., Evansville.
Greenleaf, G. F., Evansville.
Harpole, C. B., Evansville.
Hartloff, C. W., Evansville.
Hayden, A. M., Evansville.
Heberer, J. M., Evansville.
Hodson, G., Evansville.
Hudson, M. D., Evansville.
Huber, J. G., Evansville.
Ingle, C. V., Evansville.
Jerome, J. N., Evansville.
Kelsay, C., Evansville.
Kerth, J. H., Evansville.
Knapp, A. J., Evansville.
Knapp, B. J., Evansville.
Knapp, Chas., Evansville.
Jones, Geo. E., Evansville.
Laubscher, S. R., Evansville, R. R.
Laughlin, C. E., Evansville.
Laval, W. J., Evansville.
Linthicum, E., Evansville.
McCool, H. F., Evansville.
McCool, W. E., Evansville.
McClurkin, J. C., Evansville.
McCutchan, J. H., Evansville.
McCoy, P. Y., Evansville.
Macer, Thos., Evansville.
Nanney, W. N., Evansville.
Nenneker, E. H., Evansville.
Owen, J. E., Evansville.
Phares, J. W., Howell.
Pollard, W. S., Evansville.
Pritchett, W. S., Evansville.
Raydin, M., Evansville.
Reavis, W. J., Evansville.
Rietz, P. C., Evansville.
Rose, B. S., Evansville.
Sessions, S. K., Evansville.
Stark, J. W., Evansville, R. R.
Taylor, T. H., Evansville.
Tepe, G. W., Evansville.
Thomas, James, Evansville.
Varner, G. W., Evansville.
Varner, W. T., Evansville.
Verwayne, E. J., Evansville.
Viehe, C. G., Evansville.
Viehe, C. H., Evansville.
Warter, Philip, Evansville.
Walker, Edwin, Evansville.
Weever, J. B., Evansville.
Welborn, J. Y., Evansville.
Wertz, T., Evansville.
Willis, J. H., Evansville.
Wilton, I., Evansville.

Witting, A. P., St. Joseph.
Worsham, L., Evansville.
Floyd, Benj. L. W., Evansville.
Day, B. J., Evansville.
Mulhausen, M., Evansville.
Ralston, W. G., Evansville.
Schuyler, P. L., Evansville.

HONORARY.

Compton, J. W., Evansville.

VERMILLION COUNTY.

OFFICERS.

M. L. Hall, President.
W. P. Darroch, Vice-Pres.
O. M. Keyes, Sec.-Treas.

CENSORS.

I. M. Casebeer.
S. C. Darroch.
Paul H. Keyes.

MEMBERS.

Hall, M. L., Newport.
Casebeer, I. M., Newport.
Keyes, O. M., Dana.
Darroch, S. C., Cayuga.
Darroch, W. P., Cayuga.
Newhouse, O. A., Hillsdale.
Tucker, G. W., Dana.
Keyes, P. H., Dana.

VIGO COUNTY.

OFFICERS.

E. A. Aikman, President.
E. B. McAllister, Vice-Pres.
M. R. Combs, Secretary.
C. M. Smick, Treasurer.
Walker Schell, Delegate.

CENSORS.

L. J. Weinstein.
W. R. Mattox.
T. W. Moorhead.

MEMBERS.

Aikman, E. A., Clinton.
Brunker, Jas., Riley.
Bell, W. E., Terre Haute.
Belt, Richard, West Terre Haute.
Boor, M. A., Terre Haute.
Brown, T. F., Sanford.
Bernheimer, H. L., Terre Haute.
Bohn, J. C., Terre Haute.
Breaks, L. Z., Terre Haute.
Crapo, G. W., Terre Haute.
Crapo, Jno. R., Terre Haute.
Combs, M. R., Terre Haute.
Cabell, A. L., Terre Haute.
Combs, C. N. Terre Haute.
DuPuy, Chas., Riley.
Drake, Jas. F., Youngstown.
English, J. P., Terre Haute.
Frisz, Jas., Terre Haute.
Hunt, John S., West Terre Haute.
Hawkins, Madge P., Terre Haute.
Hemphill, F. H., Seeleyville.
Hebble, D. G., Terre Haute.
Jenkins, W. O., Terre Haute.
Keys, O. M., Dana.
Mattox, W. R., Terre Haute.
Moorhead, T. W., Terre Haute.
McJohnston, W. E., Terre Haute.
McClain, Leslie, Terre Haute.
McAllister, E. B., Terre Haute.
Luckett, L. P., Terre Haute.
Leavitt, R., Terre Haute.
Layman, E. W., Terre Haute.
La Bier, C. R., Terre Haute.
Niblack, E. S., Terre Haute.
Neal, E. M., Edwards.
Newton, G. O., Dana.
Newhouse, O. A., Hillsdale.
Patton, Chas., Terre Haute.

Ray, C. C., Sanford.
Stunkard, T. C., Terre Haute.
Schell, Walker, Terre Haute.
Shaley, F. W., Terre Haute.
Spigler, O. R., Terre Haute.
Smick, C. M., Terre Haute.
Stephenson, C. E., Terre Haute.
Tabor, F. A., Terre Haute.
Vancleave, M. B., Terre Haute.
Weinstein, L. J., Terre Haute.
Weinstein, Jas., Terre Haute.
Weir, S. D., Terre Haute.
Wiedeman, F. E., Terre Haute.
Willien, L. J., Terre Haute.
Washburn, A. A. Terre Haute.
Young, S. J., Terre Haute.
Yung, J. R., Terre Haute.
Nichols, John, Atherton.
Cooper, J. A., Terre Haute.

WABASH COUNTY.

OFFICERS.

T. R. Brady, President.
John Kautz, Vice-President.
Walter A. Domer, Secretary.
R. F. Blount, Treasurer.

CENSORS.

B. A. Houser.
M. E. Kenner.
P. G. Moore.

MEMBERS.

Ader, Henry, Somerset.
Andrews, Miss Leila, N. Manches'r.
Blount, R. F., Wabash.
Brady, T. R., Wabash.
Bloomer, F. H., Lagro.
Brodbeck, Geo. H., Roann.
Domer, Walter A., Wabash.
Giffen, R. I., Lagro.
Hale, M. M., Wabash.
Hale, N. T., Wabash.
Houser, B. A., Wabash.
Hardman, W. E., Lagro.
Kautz, John, Wabash.
Kitson, F. S., North Manchester.
Kern, Aaron, Wabash.
Lower, M. O., North Manchester.
Moore, P. G., Wabash.
Mooney, H. C., Laketon.
Modricker, J. M., Wabash.
Renner, M. E., Urbana.
Rodgers. A. E., Somerset.
Smith, L. W., Wabash.
Smith, L. F. J., Mrs., Wabash.
Shellhamer, D. C., Wabash.
Thompson, N. H., Wabash.
Wilson, James, Wabash.
Williams. J. B., Wabash.
Dicken, C. L., Lafountain.

HONORARY.

Ford, J. H., Indianapolis.

WARRICK COUNTY.

OFFICERS.

W. A. Hewins, President.
W. A. Hunt, Vice-President.
John H. Schuck, Sec.-Treas.
Dalton Wilson, Delegate.

CENSORS.

D. A. DeForest.
W. H. Mills.
E. M. Folsom.

MEMBERS.

Daily, W. W., Stanley.
DeForest, D. A., Boonville.
DeForest, D. F., Boonville.
Ford, W. P., Boonville.
Hewins, W. A., Chandler.
Hoover, P. N., Boonville.
Hunt, W. A., Lynnville.
Keegan, C. J., Chandler, R. R. 20.

Lett, O. A., Newburg.
Mills, W. H., Boonville.
Mills, Mary, Princeton.
Schuck, John H., Chandler.
Spradley, N. M., Tennyson.
Taylor, U. T., Newburg.
Tyner, S. L., Boonville.
Tucker, D. W., Ft. Wayne.
West, E. A., Folsomville.
Wilson, Dalton, Yankeetown.
Wilson, W., Yankeetown.
Wright, Thos., Boonville.
Youngblood, E. L., Boonville.
Springston, C. E., Selvin.

WASHINGTON COUNTY.

OFFICERS.

W. J. Purkhiser, President.
L. W. Paynter, Vice-Pres.
W. C. Camble, Sec.-Treas.
W. J. Purkhiser, Delegate.

CENSORS.

R. J. Wilson.
S. B. Howard.
J. J. Mitchell.

MEMBERS.

Bradshaw, A. E., Halo.
Camble, Wm. C., Salem.
Green, Wm. L., Pekin.
Hobbs, H. C., Salem.
Howard, S. B., Kossuth.
Kelley, Jas. F., Livonia.
Mitchell, J. J., Canton.
Paynter, L. W., Campbellsburg.
Purkhiser, W. J., Salem.
Reed, A. A., Salem.
Spurgeon, Cornelius, Kossuth.
Sturdevant, M. G., Chestnut Hill.
Wilson, R. J., Salem.
Dieff, J. F. H., Campbellsburg.

HONORARY.

Bare, John K., Salem.
Vatley, John H., New Philadelphia.

WAYNE COUNTY.

OFFICERS.

I. F. Sweeney, President.
J. E. King, Vice-President.
D. W. Stevenson, Sec.-Treas.

CENSORS.

M. F. Johnston.
Ch. Marvel.
H. B. Boyd.

MEMBERS.

Allen, J. B., Cambridge City.
Angle, G. K., Richmond.
Bond, C. S., Richmond.
Bowers, L. G., Richmond.
Boyd, H. B., Cambridge City.
Bramkamp, A. L., Richmond.
Clark, J. B., Economy.
Colburn, C. P., Richmond.
Davis, T. H., Richmond.
Ewing, U. B. G., Richmond.
Fouts, J. M., Centerville.
Gentle, L. M., Milton.
Grant, G. H., Richmond.
Griffis, W. T., Fountain City.
Haughton, R. E., Richmond.
Helms, W. M., Williamsburg.
Hopkins, R. R., Richmond.
Huff, O. N., Fountain City.
Huffman, W. G., Richmond.
Jenkins, Jennie, Richmond.
Johnston, M. F., Richmond.
Kerr, J. D., Greensfork.
Kienzle, F. W., Greensfork.
King, J. E., Richmond.
Littell, W. R., Cambridge City.
Loop, A. L., Economy.

Markley, S. C., Richmond.
Marvel, C., Richmond.
Mauk, J. R., Cambridge City.
Meek, J. B., Richmond.
Meek, M. L., Abington.
Mendenhall, W. O., Richmond.
Morrow, S. J., Richmond.
Mottier, G. A., Richmond.
Roark, C. A., Milton.
Schillinger, R., Richmond.
Smith, S. E., Richmond.
Stevenson, D. W., Richmond.
Stotlemyer, C. I., Hagerstown.
Study, J. N., Cambridge City.
Sweeney, I. F., Milton.
Wampler, J. M., Richmond.
Watts, E. K., Richmond.
Wiest, H. H., Richmond.
Weller, J. E., Richmond.
Yencer, M. W., Boston.
Young, Franklin, Richmond.
McKee, C. E., Dublin.
Bulla, Joseph M., Richmond.
Hervey, Minnie E., Richmond.
Norrell, J. R., Richmond.
Wright, Jacob E., Cambridge City.

WELLS COUNTY.

OFFICERS.

S. A. Shoemaker, President.
C. L. Blue, Vice-President.
H. W. Markley, Sec.-Treas.
G. E. Fulton, Delegate.

CENSORS.

J. C. Fulton.
I. N. Hatfield.
Louis Severin.

MEMBERS.

Garrett, F. W., Liberty Center.
Spaulding, L. A., Bluffton.
Goodin, S. A., Bluffton.
Blue, C. S., Tocsin.
Doster, Hesekiah, Poneto.
Newman, M. N., Ossian.
Mason, S., Bluffton.
Morris, Thos., Mt. Zion.
Severin, Louis, Bluffton.
Markley, H. W., Bluffton.
Hatfield, I. N., Bluffton.
Fulton, Geo. E., Bluffton.
Cook, L. H., Bluffton.
Fulton, John C., Bluffton.
Shoemaker, S. A., Poneto.
McKinney, J. W., Bluffton.
Metts, Fred, Ossian.
Metts, J. S., Ossian.
Metts, E. H., Ossian.

WHITE COUNTY.

OFFICERS.

Robt. J. Clark, President.
James L. Carr, Vice-Pres.
A. B. Cray, Secretary.
M. T. Didloke, Treasurer.
A. B. Cray, Delegate.

CENSORS.

Walter McBeth.
R. M. Reagan.
C. F. Cronk.

MEMBERS.

Carr, James L., Monon.
Clark, Robt. J., Monticello.
Clayton, Geo. R., Monon.
Cray, Arthur B., Monticello.
Cronk, C. F., Wolcott.
Didloke, M. T., Monticello.
McBeth, Walter, Burnettsville.
Medaris, John W., Brookston.
Minnick, Horace R., Idaville.
Reagan, R. M., Monon.
Reed, John H., Monticello.
Spencer, Wm. A., Wolcott.
Walker, W. O., Wolcott.
Washburn, P. E., Buffalo.

WHITLEY COUNTY.

OFFICERS.

O. V. Schuman, President.
F. G. Grisier, Secretary.
W. F. King, Treasurer.

CENSORS.

O. V. Schuman.
F. G. Grisier.
W. F. King.

MEMBERS.

Schuman, O. V., Columbia City.
Grisier, F. G., Columbia City.
Kithcart, N. I., Columbia City.
Linvill, D. S., Columbia City.
Williams, Alice B., Columbia City.
Williams, C. S., Columbia City.
Scott, J. W. C., Columbia City.
Magers, F. M., Churubusco.
King, W. F., Columbia City.
Eberhard, E. L., South Whitley.

ALPHABETICAL LIST OF MEMBERS.

[Names of former members deceased, withdrawn, removed or expelled, are omitted from the list. The Secretary will correct errors upon notification in the next issue.]

Abbott, Clarence, Otwell.
Abell, G. H., Sulphur.
Able, O. E., Trenton.
Achilles, F. W., Evansville.
Acker, M. M., Butler.
Adams, B. O., Eaton.
Adams, F. P., Elkhart.
Adams, Horace E., Harlan.
Adams, S. D., Brewersville.
Adams, Thos. J., North Salem.
Ader, Henry, Somerset.
Adye, C. H., Patronville.
Aikman, E. A. Clinton.
Ainsley, Robert, Indiana Harbor.
Alexander, J. C., Indianapolis.
Alexander, J. H., Greensburg.
Alexander, L. E., Pendleton.
Alexander, W., Frankfort.
Allen, Ch. B., Fowler.
Allen, Horace R., Indianapolis.
Allen, Irvin O., Metamora.
Allen, J. B., Cambridge City.
Allen, Wesley, West Newton.
Allhands, F. D., Wingate.
Ambrose, N. C., Lyons Station.
Amiss, J. M., Silver Lake.
Ammerman, C. E., Dugger.
Anderson, J. W., Odon.
Anderson, R. S., Princeton.
Andrews, E. H., Peru.
Andrews, George R., Mt. Summit.
Andrews, J. R., River Vale.
Andrews, Lelia, N. Manchester.
Angell, C. E., Delphi.
Angle, G. K., Richmond.
Annis, E. L., Laporte.
Anthony, J. R., Indianapolis.
Arburn, Charles, Wadesville.
Armbruster, B. F., Columbus.
Armfield, T. O., Elwood.
Armington, John, Anderson.
Armstrong, A., Kewana.
Armstrong, L. P., Newton.
Arthur, M. L., Patoka.
Arwine, J. S., Columbus.
Ash, E. E., Goshen.
Aspinwall, N. B., Plymouth.
Aspy, H. M., Geneva.
Atkinson, Curtis, Oxford.
Atkinson, J. M., Eaton.
Austin, Fred H., North Madison.
Austin, M. A., Anderson.
Axline, J. A., Noblesville.

Bacon, C. F., Evansville.
Bacon, V. V., Michigan City.
Bahr, Max A., Indianapolis.
Baker, Erasmus S., West Point.
Baker, Ernest S., Lafayette.
Baker, J. V., Harrodsburg.
Baker, R. E., Orleans.
Baldwin, S. J., Hortonville.
Ball, E. J., Valparaiso.
Ball, J. R., Lebanon.
Ball, L. L., Muncie.
Ball, T. Z., Waveland.
Ballard, Jos H., Indianapolis.
Banker, A. J., Columbus.
Banker, W. H., Columbus.
Barber, A. E., South Bend.
Barclay, W. H., Farmer's Retreat.
Barcus, P. J., Crawfordsville.

Barker, Joel T., Danville.
Barker, Thomas R., Danville.
Barnard, P. C., Oakville.
Barnes, Arthur L., Southport.
Barnes, C. A., Greenfield.
Barnes, G. O., Seymour.
Barnett, Charles E., Ft. Wayne.
Barnett, W. W., Ft. Wayne.
Barnfield, J. H., Logansport.
Barnhill, Jno. F., Indianapolis.
Barns, W. C., Marion.
Barrett, C. P., Oliver.
Bartholomew, A. C., Logansport.
Bartlett, C. G., Lewisville.
Bash, J. M., Warsaw.
Basinger, T. W., Petersburg.
Bastin, J. V., Greencastle.
Bates, J. M., Broad Ripple.
Batman, W. F., Ladoga.
Baughman, J. N., Evansville.
Baumgartner, O. C., Rockport.
Baxter, J. C., Auburn.
Beall, Charles G., Ft. Wayne.
Bear, L. H., Vevay.
Beard, E. R., Liberty.
Beard, Schuyler C., Vincennes.
Beasley, George F., Lafayette.
Beavers, Seth D., Decatur.
Beck, William S., Indianapolis.
Beckes, Lyman M., Vincennes.
Beckes, Norman E., Vincennes.
Beckett, G. A., Benham.
Becknell, I. J., Goshen.
Bedwell, T. S., Dugger.
Begley, B. W., Evansville.
Bell, E. Edwin, Ft. Wayne.
Bell, Guido, Indianapolis.
Bell, J. N., New Burlington.
Bell, W. E., Terre Haute.
Bell, William H., Logansport.
Belt, Richard, West Terre Haute.
Benedict, H., Springport.
Benham, Ch. W., Vincennes.
Benham, J. W., Columbus.
Bennett, J. B., Cannelton.
Berauer, J. M., Indianapolis.
Berkley, A. L., Rensselaer.
Bernheimer, H. L., Terre Haute.
Berteling, J. B., South Bend.
Besser, E., Remington.
Bethel, W. J., Winslow.
Bevier, Frank, Waterloo.
Bice, L. C., Columbus.
Biery, T. E., Scottsburg.
Binkley, J. F., Evansville.
Birchfield, J. W., New Alsace.
Bird, Charles R., Indianapolis.
Bird, J. E., New Albany.
Bitting, A. W., West Lafayette.
Bitz, J. F., Evansville.
Black, F. W., Ligonier.
Blair, Frank, Princeton.
Blair, J. S., Lynn.
Blair, W. W., Princeton.
Blinks, E. G., Michigan City.
Bloom, H. G., Oxford.
Bloomer, F. H., Lagro.
Bloomfield, E. M., Peru.
Blount, R. D., Valparaiso.
Blount, R. F., Wabash.
Blue, C. S., Tocsin.
Boersig, Jos. A., Indianapolis.
Boggs, M. M., Macy.
Bohn, J. C., Terre Haute.
Bond, C. S., Richmond.
Bond, Marc L., Aurora.
Bond, R. C., Aurora.
Boone, B. H., Boggstown.
Boor, M. A., Terre Haute.
Boor, W. F., New Castle.
Boram, E. V., Anderson.
Borley, E. R., South Bend.
Borley, W. E., Mishawaka.
Borton, T. Artemus, Plymouth.
Bottorff, John C., Corydon.
Bounell, T. A., Jamestown.
Bowell, B. O. Carr, Laporte.
Bowen, J. F., Occident.
Bower, G. B. M., Ft. Wayne.
Bower, Jno. V., Malott Park.
Bowers, L. G., Richmond.
Bowers, Whitfield, Michigan City.
Bowker, Jas. J., Laotto.
Bowlby, Jos., Shelbyville.
Boyd, C. E., West Baden.
Boyd, C. L., Paoli.

Boyd, H. B., Cambridge City.
Boyden, C. F., Evansville.
Boyden, W. H., Anderson.
Boyers, James S., Decatur.
Brackney, M. F., Mooresville.
Bradley, J. S., Hall.
Bradshaw, A. E., Halo.
Brady, T. R., Wabash.
Bramkamp, A. L., Richmond.
Brandon, W. S., Daleville.
Brannon, Charles D., Crown Point.
Braxtan, T. N., Loogootee.
Brayton, A. W., Indianapolis.
Brayton, N. D., Indianapolis.
Breaks, L. Z., Terre Haute.
Breedlove, G. B., Brooklyn.
Brendell, John F., Zionsville.
Brent, I. N., Jamestown.
Briggs, C. F., Sullivan.
Brill, Jas. H., Indianapolis.
Brittain, S. H., Loogootee.
Brodbeck, George H., Roann.
Brokaw, R. E., Portland.
Brose, L. D., Evansville.
Broughton, F. A., Waterloo.
Broughton, F. H., Wolcottsville.
Brown, Archibald, Rochester.
Brown, A. L., Alamo.
Brown, A. S., Paragon.
Brown, Benj. A., Indianapolis.
Brown, Charles A., Plymouth.
Brown, E. A., Indianapolis.
Brown, H. M., Indiana Harbor.
Brown, J. R., Sumption Prairie.
Brown, S. I., Knox.
Brown, T. F., Sanford.
Brownback, O. W., Pendleton.
Brucker, C. M., Tell City.
Brudi, G. G., New Haven.
Bruner, C. K., Greenfield.
Bruner, Mary L., Greenfield.
Brunker, James, Riley.
Bryan, T. L., Evansville.
Buchanan, W. A., Hammond.
Buchman, A. P., Ft. Wayne.
Buchtel, I. O., Auburn.
Bucklin, G. W., Muncie.
Buehler, Eugene, Indianapolis.
Buehler, Amelia K., Indianapolis.
Bulla, J. M., Richmond.
Bulson, Albert E., Jr., Ft. Wayne.
Burcham, H. C., Albany.
Burckett, C. W., Warsaw.
Burckhardt, Louis, Indianapolis.
Burley, David M., Vincennes.
Burroughs, J. P., Westport.
Burton, A. R., Princeton.
Busse, E. P., Evansville.
Butler, C. A., New Castle.
Butler, W. H., Columbus.
Butterworth, C. M., South Bend.
Button, C. E., Crown Point.
Byers, O. A., Petersburg.

Cabell, A. L., Terre Haute.
Cady, N. W., Logansport.
Caffee, A. H., Hymera.
Cain, D. B., Evansville.
Cain, Joseph D., Indianapolis.
Calvert, J. H., Milton, Ky.
Calvin, J. C., Ft. Wayne.
Calvin, W. D., Ft. Wayne.
Camble, William C., Salem.
Cameron, J. F., Hamilton.
Campbell, Cyrus W., Hammond.
Campbell, Frank, Shelbyville.
Campbell, W. S., West Point.
Canfield, B. V., Indianapolis.
Caney, P. H., Vincennes.
Cannon, G. H., New Albany.
Cannon, J. H., South Bend.
Cantrall, F. A., Evansville.
Caplinger, C. A., Wallace.
Carey, W. W., Spencerville.
Carl, O. U., Peru.
Carnes, Z., Greenwood.
Carney, C. E., Delphi.
Carpender, W. P., Akron.
Carr, James L., Monon.
Carson, J. C., Valparaiso.
Carson, L. O., Traders Point.
Carter, Amos, Plainfield.
Carter, Calvin, Brookville.
Carter, Laura, Boston, Mass.
Carver, W. F., Albion.
Case, W. W., Zenas.

Casebeer, I. N., Newport.
Casebeer, J. B., Auburn.
Caylor, C. E., Pennville.
Cecil, A. A., Muncie.
Chafee, Wm. C., Huntington.
Chamberlin, Cameron, Indianapolis.
Chambers, B. F., Lyons.
Chambers, J. D., Ft. Wayne.
Chance, B. V., Windfall.
Chancellor, S. R., Kokomo.
Charles, Etta, Summitville.
Charlton, Fred. R., Indianapolis.
Chenoweth, E. B., Quincey.
Chenoweth, F. A., Winchester.
Chenoweth, N. T., Windsor.
Childs, A. G. W., Madison.
Chittenden, E. W., Anderson.
Chittenden, G. F., Anderson.
Chittick, Andrew, Burlington.
Chittick, Charles, Frankfort.
Chitwood, John E., Connersville.
Christie, James H., Canaan.
Christian, Wilmer, Indianapolis.
Clapper, Manton M., Hartford City.
Clark, C. S., Decatur.
Clark, D. D., Decatur.
Clark, E. D., Indianapolis.
Clark, J. B., Economy.
Clark, J. H., Connersville.
Clark, Joseph H., Princeton.
Clark, J. I., Owensville.
Clark, J. T., Hammond.
Clark, Robert J., Monticello.
Clayton, George R., Monon.
Cleveland, W. F., Evansville.
Clevenger, W. F., Indianapolis.
Cline, George F., Scottsburg.
Cline, Lewis C., Indianapolis.
Close, T. H., Scottsburg.
Clouse, Bertha A., Hope.
Cluthe, William, Tell City.
Coble, Jacob, Spencer.
Cochran, R. W., Madison.
Cochran, T. C., Sharpsville.
Coffin, A., Carlos City.
Colburn, C. P., Richmond.
Cole, A. M., Indianapolis.
Cole, W. H., Switz City.
Coleman, J. W., Petersburg.
Coleman, W. H., Evansville.
Coleman, W. S., Rushville.
Collier, T. E., Brook.
Collins, A. W., Anderson.
Collins, C. C., Roachdale.
Collop, Emma J., Indianapolis.
Combs, C. N., Terre Haute.
Combs, George W., Indianapolis.
Combs, M. R., Terre Haute.
Comingor, J. A., Indianapolis.
Comstock, J. A., Greenfield.
Conley, L. H., Gas City.
Connelly, H. M., Shelbyville.
Conrad, E. M., Anderson.
Conway, C. E., Perkinsville.
Cook, B. H., Anderson.
Cook, Charles J., Indianapolis.
Cook, Charles P., New Albany.
Cook, Clark, Fowler.
Cook, George J., Indianapolis.
Cook, J. A., Goshen.
Cook, J. W., Pendleton.
Cook, L. H., Bluffton.
Cook, P. M., Solsberry.
Cook, R. C. N., Boswell.
Coombs, David, Charlestown.
Coomes, M. J., Versailles.
Cooper, A. M., Muncie.
Cooper, Ernest, Plainfield.
Cooper, J. A., Terre Haute.
Cooperider, J., Madison.
Copeland, Charles C., N. Madison.
Copeland, G. W., Moorefield.
Copeland, R. M., Bennington.
Corbin, E. M., Sullivan.
Corey, Charles W., Hartford City.
Corey, J. D., McCordsville.
Corey, L. J., VanBuren.
Cosby, George O., Burnsville.
Costello, H. F., Decatur.
Cottingham, I. E., Evansville.
Coulson, S. B., Jackson Hill.
Courtney, Thomas E., Indianapolis.
Coverdale, Earl G., Decatur.
Coverdale, J. S., Decatur.

Covertson, J. W., Frankton.
Cowan, E. H., Crawfordsville.
Cowen, Lewis C., Rising Sun.
Cowing, H. A., Muncie.
Cox, C. E., Cannelton.
Cox, C. R., Lynn.
Cox, D. A., Howell.
Cox, Edgar, Kokomo.
Cox, J. B., Mt. Vernon.
Cox, J. G., Holm.
Cox, L. T., Napoleon.
Cox, N. D., Spencer.
Craig, J. A. Greenwood.
Craig, T. E., Lawrenceburg.
Cramm, C. J., Fulda.
Crampton, Charles C., Delphi.
Crapo, G. W., Terre Haute.
Crapo, John R., Terre Haute.
Cravens, E. R., Linton.
Cravens, William R., Bloomfield.
Crawford, E. T. W., Hanna.
Crawford, G. S., Clifty.
Cray, Arthur B., Monticello.
Creel, T. J., Angola.
Cregor, F. W., Carthage.
Cremeans, W. C., Mt. Vernon.
Crockett, Lillian A., Indianapolis.
Cromer, L. G., Union City.
Cronk, C. F., Wolcott.
Cronkhite, C. C., Marion.
Crose, Samuel E., Indianapolis.
Crouse, Henry W., Knightstown.
Crowder, J. R., Sullivan.
Crowder, R. H., Sullivan.
Crull, E. A., Ft. Wayne.
Crum, Claude C., Jeffersonville.
Crumrine, I. S. J., Landess.
Culbertson, Scott, Vevay.
Cully, John F., Bainbridge.
Culmer, W. N., Bloomington.
Culver, D. F., Indianapolis.
Cummings, D. J., Ewing.
Cummings, D. J., Jr., Ewing.
Cummings, H. A., Mooney.
Cummings, S. M., Elkhart.
Cunningham, H. L., Salem Center.
Cunningham, S. R., Indianapolis.
Current, O. E., Farmland.
Curtiss, W. H., Frankfort.
Cushman, A., Graysville.
Cushman, R. A., Princeton.

Dailey, J. M., Rockport.
Daily, W. W., Stanley.
Dale, B. C., Marion.
Dale, Omar E., Alquina.
Dancer, Charles R., Ft. Wayne.
Daniel, William, Corydon.
Daniels, George, Marion.
Daniels, G. W., Sweetser.
Darby, A. B., Waterloo.
Darroch, S. C., Cayuga.
Darroch, W. P., Cayuga.
Daugherty, C. A., South Bend.
Davenport, H. F., Hayden.
Davenport, William H., Vincennes.
Davidson, A. W., Brownsburg.
Davidson, E. E., Lafayette.
Davidson, J. F., Crawfordsville.
Davidson, W. R., Evansville.
Davidson, W. R., Indianapolis.
Davis, C. P., Galena.
Davis, D. F., New Albany.
Davis, F. L., Evansville.
Davis, John Q., Indianapolis.
Davis, L. N., Farmland.
Davis, Royce, Decker.
Davis, T. H., Richmond.
Davis, W. M., Coal City.
Davisson, Henry C., Hartford City.
Dean, E. R., South Bend.
DeForest, D. A., Boonville.
DeForest, D. F., Boonville.
Defrees, H. J., Nappanee.
DeHaas, T. W., Indianapolis.
DeLong, O. A., Azalia.
Deming, N. L., Ft. Wayne.
Demotte, Jerome, Odon.
Dennis, F. L., Crawfordsville.
Denny, Charles, Belleview.
Denny, George E., Madison.
Denson, H. A., Indianapolis.
Depew, E. W., Wolf Lake.
Derbyshire, E., Connersville.

DeVaney, Mitchell O., Indianapolis.
DeWeese, L., Hemlock.
Dewey, F. N., Elkhart.
Dicken, C. L., Lafontaine.
Dickes, J. T., Portland.
Dickey, A. S., Tipton.
Didlake, M. T., Monticello.
Dieff, J. F. H., Campbellsburg.
Dierking, A. W., Oolitic.
Dilley, Fred C., Brazil.
Dillman, L. D., Connersville.
Dillinger, J. R., French Lick.
Dinnen, James M., Ft. Wayne.
Dinsmore, Walter H., Kramer.
Dippell, Emil T., Huntington.
Diven, C. E., Anderson.
Doan, W. W., New Lancaster.
Dobbins, A. O., Wheeler.
Dodds, W. T. S., Indianapolis.
Doerr, J. E., Mt. Vernon.
Dollens, T C., Ttrinity Springs.
Dome, D. C., Troy.
Dome, H. S., Eureka.
Domer, W. A., Wabash.
Donica, T. N., Tunnelton.
Dooley, A. J., Marion.
Dooley, M. M., Loogootee.
Dorsey, Francis O., Indianapolis.
Doster, Hezekiah, Poneto.
Douglas, Dilver E., E. Enterprise.
Dove, S. C., Westfield.
Drake, Jas. F., Youngstown.
Drake, Morris, Shelbyville.
Drayer, L. P., Ft. Wayne.
Dresch, C. A., Mishawaka.
Drescher, Marie L., Michigan City.
Driscoll, C. C., Lafayette.
Druley, O. E., Anderson.
Dryer, D. W., Lagrange.
Duddenhausen, W. C., Evansville.
Duemling, H. A., Ft. Wayne.
Dugdale, R. B., South Bend.
Duncan, J. B., Bedford.
Duncan, Wm. F., Manchester.
Dunlap, Robert, Kendallville.
Dunlavey, Ira E., Indianapolis.
Dunn, W. H., Gaston.
Dunning, L. H., Indianapolis.
Dupuy, Charles, Riley.
Durham, Charles O., Indianapolis.
Durham, J. L., Graysville.
Dutrow, C. E., Bristol.

Eads, C. V., Ambia.
Earp, S. E., Indianapolis.
Eash, S. M., Shipshewana.
Easley, E. P., New Albany.
Eastman, F. P., South Bend.
Eastman, J. R., Indianapolis.
Eastman, T. B., Indianapolis.
Eberhard, E. L., South Whitley.
Eckelman, F. C., Elkhart.
Eckelman, M. M., Elkhart.
Edenharter, George F., Indianapolis
Edmonds, S. A., Goshen.
Edwards, C. H., Sullivan.
Eickel, S. J., Evansville.
Eidson, J. W., Bourbon.
Eisenbeiss, C. M., Elkhart.
Elder, Edward C., Logansport.
Eley, Lorenzo D., Plymouth.
Elfers, John, Rising Sun.
Elliott, J. W., Linden.
Elliott, R. H., Connersville.
Elrod, E. L., Henryville.
Elrod, M. N., Columbus.
Elrod, S. B., Raglesville.
Emery, C. H., Bedford.
Emmerl, E. J., Lawrenceburg.
Emmick. T. C., Mt. Vernon
Engleman, L. P., Reese Mill.
Englerth, P. O., North Judson.
English, C. H., Ft. Wayne.
English, E. C., Rennselaer
English, J. P., Terre Haute.
Enslen, Wm. M., Ft. Wayne.
Ensminger, S. L., Crawfordsville.
Erdman, Bernhard, Indianapolis.
Eshelman, W. A., Anderson.
Essex, H. L., Alert.
Estes, J. W., Shelbyville.
Etter, J. R., Crawfordsville.
Evans, E. B., Greencastle.
Evans, H. M., Valparaiso.

Evans, J. J., Winchester.
Evans, John M., Mellott.
Ewing, U. B. G., Richmond.

Fagaly, A. T., Lawrenceburg.
Fair, H. D., Muncie.
Fairfield, W. J., Anderson.
Faith, Abraham H., Washington.
Fankboner, W. A., Marion.
Farrabee, C. E., Danville.
Farver, M. A., Middlebury.
Farver, G. W., Montezuma.
Fattic, John B., Anderson.
Faulkner, Clara, Hobart.
Fenton, S. C., Bosswell.
Ferguson, C. E., Indianapolis.
Fermier, P. G., Leesburg.
Fernald, W. J., Frankfort.
Ferrell, J. E., Eden.
Ferris, Edgar S., New Castle.
Fetzer, John E., Corydon.
Field, David L., Jeffersonville.
Field, W. H., Evansville.
Fink, H. A., South Bend.
Finley, George W., Brazil.
Finney, Charles J., Attica.
Fisher, A. L., Elkhart.
Fisher, Jenj. T., Spencer.
Fisher, E. S., Markle.
Fisher, J. M., Lapel.
Fitch, A. P., Lebanon.
Fitzpatrick, B., Columbus.
Fleming, J. C., Elkhart.
Fletcher, C. I., Indianapolis.
Fletcher, W. B., Indianapolis.
Floyd, Benj. L. W., Evansville.
Flucks, Carl, St. Wendell.
Flynn, E. N., Jeffersonville.
Flynn, Wm., Marion.
Fodrea, Z. H., Westfield.
Ford, J. H., Indianapolis.
Ford, Katherine C., Indianapolis.
Ford, O. P. M., Rising Sun.
Ford, W. P., Boonville.
Forry, Benj. F., Bath
Foster, John H., Wolcottville.
Foust, P. G., Santa Fe.
Fouts, J. M., Centerville.
Fox, Henry A., Gosport.
Fox, R. H., Freelandsville.
Foxworthy, Frank W., Indianapolis
Francis, E. T., Columbus.
Francis, W. R., Marion.
Franks, H. P., Muncie.
Franks, W. H., Ligonier.
Frazer, Charles, Muncie.
Freeland, John L., Indianapolis.
Freeland, John T., Bedford.
Freeman, E. D., Osgood.
Freeman, G. M., Shoals.
Freeman, James, Sullivan.
Fretz, J. C., Deedsville.
Frick, H. C., Evansville.
Friermood, E. K., Greentown.
Frink, C. W., Elkhart.
Frisz, Joseph A., Terre Haute.
Fritsch, W. A., Evansville.
Fry, B. C., Indianapolis.
Fuller, W. H., North Vernon.
Fullinwider, C. H., Mt. Vernon.
Fulton, Dudley, South Bend.
Fulton, George E., Bluffton.
Fulton, John C., Bluffton.
Funk, Austin, New Albany.
Funk, Z. T., Corydon.
Furniss, S. A., Indianapolis.

Gabe, Harry E., Indianapolis.
Gaddy, O., Paris Crossing.
Gantz, Thos., Freedom.
Garber, J. B., Dunkirk.
Gard, O., Frankfort.
Garner, C. A., Kendallville.
Gardner, Lucy W., Bloomington.
Garey, Dumont, New Albany.
Garr, J. O., Kokomo.
Garrett, F. W., Liberty Center.
Garretson, W. M., Perkinsville.
Garshweiler, Wm. P., Indianapolis.
Garstang, R. W., Indianapolis.
Gates, William J., Indianapolis.
Geary, J. K., Ft. Wayne.
Gentle, L. M., Milton.
Gephart, Roscoe T., Burney.

Gerard, R. H., Crawfordsville.
Gerrish, M. F., Seymour.
Gers, Henry, Washington.
Gibbons, J. A., Mitchell.
Gibbs, Charles Milo, Greenfield.
Gibson, J. J., Alexandria.
Giffen, R. I., Lagro.
Gifford, A. W., Tipton.
Gilbert, J. L., Logansport.
Gilbert, Joseph L., Kendallville.
Gilbert, W. H., Evansville.
Gillespie, C. E., Crothersville.
Gillespie, J. T., Reelsville.
Giltner, Harry A., Lexington.
Gillum, W. H., Rockville.
Glaze, J. M., New Harmony.
Glover, John F., Evansville.
Goar, C. S., Indianapolis.
Gobble, F. R., English.
Goebel, William, Elkhart.
Good, A. H., Selma.
Good, Charles H., Warren.
Goodin, S. A., Bluffton.
Goodrich, C. D., Elkhart.
Goodwin, C. B., Kendallville.
Gordin, S. E., Alquina.
Gordon, Charles W., Ft. Wayne.
Goss, M., Rockville.
Graessle, G. G., Seymour.
Graham, Alois B., Indianapolis.
Graham, Hannah, Indianapolis.
Graham, Nathan P., Madison.
Graham, Oliver P., Jeffersonville.
Graham, W. B., Noblesville.
Grant, G. E., Marengo.
Grant, G. H., Richmond.
Gravis, C. M., Martinsville.
Gray, J. L., Laporte.
Grayston, B. W. B., Huntington.
Grayston, Charles E., Huntington.
Grayston, Fred W., Huntington.
Green, E. V., Martinsville.
Green, G. R., Muncie.
Green, J. H., North Vernon.
Green, Lot, Rushville.
Green, Thomas C., Albion.
Green, T. G., Shelbyville.
Green, W. F., Shelbyville.
Green, William L., Pekin.
Green, W. T., Albion.
Greenawalt, G. L., Ft. Wayne.
Greene, Henry E., Crawfordsville.
Greene, J. B., Mishawaka.
Greenleaf, G. F., Evansville.
Greenleaf, H. A., Markland.
Greenwell, F., Huntertown.
Gregory, Henry, Laurel.
Greist, H. W., New Castle.
Griffis, W. T., Fountain City.
Griffith, M. J., Crawfordsville.
Griffith, T. J., Crawfordsville.
Grim, Geo. B., Oaktown.
Grishaw, H. E., Tipton.
Grisier, F. G., Columbia City.
Griswold, E. H., Peru.
Groff, John H., Cumberland.
Gronendyke, O. J., New Castle.
Gronendyke, T. W., New Castle.
Gross, W. O., Ft. Wayne.
Grubb, Albert G., Mongo.
Gwaltney, S. P., Midway.

Hackleman, F. G., Rushville.
Hadley, James W., Rossville.
Hager, W. A., South Bend.
Haggerty, R. I., Elkhart.
Hale, M. M., Wabash.
Hale, N. T., Wabash.
Haliermal, Clara L., Corydon.
Hall, H. J., Franklin.
Hall, H. M., Millersburg.
Hall, J. W., Portland.
Hall, M. L., Newport.
Hall, Silas, Vincennes.
Hall, T. J., Grafton.
Hallanan, Joseph A., Logansport.
Hamilton, E. Everett, Connersville.
Hamilton, N. C., Kokomo.
Hamilton, S. N., Connersville.
Hammersley, W. L., Frankfort.
Hammond, A. K., Ft. Wayne.
Hammond, G. B., English.
Hampton, S. E., Milton, Ky.
Hancock, C. F. C., Jeffersonville.
Hanna, L. M., Greencastle.

Hansel, C. A., Lakeville.
Hardesty, J. C., New Castle.
Hardman, W. E., Largo.
Hardwick, R. L., Mt. Vernon.
Hardy, J. S., Lebanon.
Hargis, W. T., Derby.
Harpole, C. B., Evansville.
Harris, C. E., Bloomington.
Harris, Cyrus M., Bourbon.
Harris, J. E., Bloomington.
Harrison, W. H., Kokomo.
Harryman, S. E., Lawrenceburg.
Harter, Harry, Newtonville.
Harter, J. H., Anderson.
Harter, W. P., Anderson.
Hartloff, C. W., Evansville.
Hartsock, W. B., Waverly.
Harvey, Jesse B., Indianapolis.
Haslep, Marie, Indianapolis.
Hassenmiller, M., West Baden.
Hatfield, I. N., Bluffton.
Hatfield, J. F., Moran.
Hauenstein, G. W., Elkhart.
Haughton, R. E., Richmond.
Havice, S. H., Ft. Wayne.
Hawes, James K., Clifford.
Hawkins, E., Greencastle.
Hawkins, Madge P., Terre Haute.
Hawley, Robert D., Columbus.
Haworth, M. C., Noblesville.
Hayden, A. M., Evansville.
Hayden, David N., Vevay.
Hayes, John W., Albion.
Hays, Franklin W., Indianapolis.
Hays, T. A., Burns City.
Hazel, James T., Freedom.
Hazelwood, F. W., New Albany.
Hazelwood, John, New Albany.
Heath, Frederic C., Indianapolis.
Hebble, D. G., Terre Haute.
Heberer, J. M., Evansville.
Held, Henry W., Vincennes.
Heller, Fred, Brownstown.
Heller, Oscar, Greenfield.
Helm, Charles J., Peru.
Helms, W. M., Williamsburg.
Hemphill, F. H., Seeleyville.
Hendershot, C. T., Cannelton.
Henderson, J. T., Covington.
Hendricks, W. E., Martinsville.
Hendrickson, A. M. D., Magnet.
Henley, A., Fairmount.
Henry, W. C., Aurora.
Henson, Theo., Martinsville.
Herbert, Leo H., Indianapolis.
Herr, Henry, Washington.
Herrmann, Arthur J., Logansport.
Herrmann, Franz J., Logansport.
Hershey, F. C., Carmel.
Hershey, K. C., Carmel.
Hervey, Minnie E., Richmond.
Hess, F. C., Cadiz.
Hess, J. N., New Marion.
Hess, M. M., Morristown.
Hessler, Robert, Logansport.
Hetherington, J. P., Logansport.
Hetrick, J., Ft. Wayne.
Heusler, Ernest C., Howell.
Hewins, W. A., Chandler.
Hiatt, J. E., New Castle.
Hibbs, Irwin, Martinsville.
Hickam, Wilford, Spencer.
Hickman, C. C., Yeoman.
Hicks, C., Mt. Vernon.
Hicks, J. C., Napoleon.
Hicks, J. L., Arcadia.
Hicks, Jas. M., Huntington.
Hill, F. E., Muncie.
Hill, G. S., South Bend.
Hill, Henry B., Logansport.
Hill, J. W., South Bend.
Hill, L. B., Seymour.
Hillis, J. D., Lafayette.
Hines, F. M., Auburn.
Hines, W. L., Warsaw.
Hinkle, E. I., Goldsmith.
Hoadley, W. J., Danville.
Hoag, W. I., Indianapolis.
Hoagland, C. S., Milroy.
Hobbs, H. C., Salem.
Hodges, E. F., Indianapolis.
Hodges, Fletcher, Indianapolis.
Hodgin, E. E., Indianapolis.
Hodson, Geo., Evansville.

Hoffman, G. E., Rochester.
Hoffman, G. H., Ft. Wayne.
Hoggatt, W. W., French Lick.
Holder, R. E., Columbus.
Holder, Union H., Washington.
Holland, G. F., Bloomington.
Holland, P. C., Bloomington.
Hollingsworth, Ernest, Washington.
Hollingsworth, M. P., Princeton.
Hollingsworth, S. G., Harland.
Hollis, Ella A., Hartford City.
Hollis, Samuel, Hartford City.
Hollis, Wm. Allen, Hartford City.
Holton, William, New Harmony.
Holtzendorff, A. C., Plymouth.
Holtzendorff, C. F., Plymouth.
Holtzendorff, H., Mishawaka.
Holtzman, Rice C., Stinesville.
Hood, Thomas C., Indianapolis.
Hoopingarner, G. B., Elkhart.
Hoover, L., Decker.
Hoover, P. N., Boonville.
Hope, C. F., Coatsville.
Hopkins, R. R., Richmond.
Hopper, M. S., Lafayette.
Horn, A. H., Putnamville.
Horne, W. N., Anderson.
Hornocker, S. D., Silverville.
Horrom, G. W., Hatfield.
Hoskins, Walter D., Indianapolis.
Hosman, W. E., Akron.
Hostetler, A. J., Shipshewana.
House, G. H. F., Indianapolis.
Houser, B. A., Wabash.
Howard, J. L., West Baden.
Howard, Noble P., Greenfield.
Howard, S. B., Kossuth.
Howat, W. F., Hammond.
Huber, J. G., Evansville.
Hudelson, L. R., Milroy.
Hudson, M. D., Evansville.
Huff, O. N., Fountain City.
Huffman, W. G., Richmond.
Hughes, W. L., Indiana Harbor.
Hughes, Wm. F., Indianapolis.
Humphreys, F. B., Angola.
Hunt, B. S., Winchester.
Hunt. F. P., Leipsic.
Hunt, John S., W. Terre Haute.
Hunt, J. W., Anderson.
Hunt, Stephen, Plainfield.
Hunt, Tighlman, Plainfield.
Hunt, W. A., Lynnville.
Hunter, F. S., Bedford.
Hunter, John R., Huntington.
Hunter, W. M., Petersburg.
Hupe, Charles, Lafayette.
Hurt, G. K., Thorntown.
Hurty, John N., Indianapolis.
Hutcheson, W. R., Greencastle.
Hutchings, B. F., Crawfordsville.
Hutchings, F. F., Indianapolis.
Hyde, L. A., Linton.
Hylton, A. J., Mooresville.

Ihrig, F. M., Goshen.
Imel, E. S., Petersburg.
Ingle, C. V., Evansville.
Inlow, G. I., Blue Ridge.
Inlow, I. N., Blue Ridge.
Ireland, G. L., Winslow.
Irwin, A. J., Goshen.

Jackson, F. G., Muncie.
Jackson, J. H., Pleasantville.
Jaeger, A. S., Indianapolis.
Jameson, Henry, Indianapolis.
Jaquith, O. S., Lawrenceburg.
Jay, M. T., Portland.
Jeffries, H. S., Upland.
Jeffries, Kenneth I., Richmond.
Jeffries, W. E., Indianapolis.
Jenkins, Jennie, Richmond.
Jenkins, J. M., Cortland.
Jenkins, J. R., Boggstown.
Jenkins, W. O., Terre Haute.
Jennings, W. L., Bridgeport.
Jerome, J. N., Evansville.
Jessup, Maria A., Friendswood.
Jobes, N. E., Indianapolis.
Johnson, A. R., Atwood.
Johnson, David E., Moore's Hill.
Johnson, J. E., Marion.
Johnson, L. B., Ireland.

Johnson, Luther, Bourbon.
Johnson, O. B., Lizton.
Johnson, S. C., Rennselaer.
Johnson, Sherman A., Tippecanoe.
Johnson, W. A., Wawaka.
Johnson, W. H., Brightwood.
Johnston, A., Akron.
Johnston, M. A., Oaktown.
Johnston, M. F., Richmond.
Johnston, S. A., Indianapolis.
Jolly, J. C., Lake.
Jones, A. B., Lebanon.
Jones, Cadwalader, Charlestown.
Jones, George E., Evansville.
Jones, H., Ober.
Jones, H. E., Anderson.
Jones, H. I., Indianapolis.
Jones, J. G., Versailles.
Jones, Jesse M., Cataract.
Jones, O. H., Crawfordsville.
Jones, P. W., Ober.
Jones, Rilus E., Clayton.
Jump, S. G., Selma.
Justice, Wm. A., Greenfield.

Kahlo, Geo. D., Indianapolis.
Kahn, David L., Indianapolis.
Kalbfleisch, A. H., Peru.
Kamman, G. H., Seymour.
Kamman, H. H., Columbus.
Kane, Alfred, Ft. Wayne.
Kaple, J. D., South Bend.
Kaszer, Jacob, Plymouth.
Kautz, John, Wabash.
Keegan, C. J., Chandler.
Keegan, E. W., Crawfordsville.
Keeling, J. E., Waldron.
Keeney, B. G., Shelbyville.
Keiper, G. F., Lafayette.
Kell, S. D., Liberty.
Keller, F. G., Alexandria.
Keller, H. E., Decatur.
Kelley, J. N., Westville.
Kelley, James F., Livonia.
Kelly, J. C., Mitchell.
Kelly, L. H., Hammond.
Kelsay, C., Evansville.
Kelsey, A. J., Monterey.
Kelsey, William, Monterey.
Kelso, U. G., Dubois.
Kemper, A. T., Muncie.
Kemper, G. W. H., Muncie.
Kemper, W. W., Muncie.
Kempf, E. J., Jasper.
Kendal, Arnold P., Austin.
Kendle, G. S., Princeton.
Kennedy, Albert C., Patricksburg.
Kennedy, Bernays, Indianapolis.
Kennedy, D. P., Martinsville.
Kennedy, F., Goodland.
Kennedy, John, Paragon.
Kennedy, Samuel, Shelbyville.
Kennedy, T. C., Shelbyville.
Kennedy, W. H., Shelbyville.
Kercheval, A. F., Greensburg.
Kern, Aaaron, Wabash.
Kerr, J. D., Greensfork.
Kerrigan, J. J., Michigan City.
Kerth, J. H., Evansville.
Kesler, A. J., Ft. Wayne.
Kessinger, Ellis, Sanborn.
Ketcham, C. L., Guilford.
Ketchum, George V., Portland, Ore.
Keyes, O. M., Dana.
Keyes, P. H., Dana.
Kienzle, F. W., Greensfork.
Kilgore, Frank, Dalesville.
Kimball, M. C., Converse.
Kimball, T. C., Marion.
Kimberlin, A. C., Indianapolis.
Kime, J. T., Petersburg.
Kimmel, A. J., Hudson.
King, H. O., Pierceton.
King, J. E., Richmond.
King, J. M., Greencastle.
King, M. O., Rochester.
King, W. F., Columbia City.
King, Warren R., Greenfield.
Kinneman, J. G., Goodland.
Kirk, E. E., Spiceland.
Kirkpatrick, A. M., Columbus.
Kiser, Edgar F., Indianapolis.
Kistner, J. W., Elkhart.
Kithcart, N. I., Columbia City.

Kitson, F. S., N. Manchester.
Knapp, A. B., Washington.
Knapp, A. J., Evansville.
Knapp, B. J., Evansville.
Knapp, Charles, Evansville.
Knapp, George, Vincennes.
Knapp, H. C., Haysville.
Knapp, Victor, Ferdinand.
Kneale, W. W., Anderson.
Knepper, E. W., Albion.
Knepple, La Marr, Kokomo.
Knoefel, August, New Albany.
Knott, D. C., Plymouth.
Knox, E. S., Indianapolis.
Kohr, T. W., Hammond.
Kolmer, John, Indianapolis.
Koons, H. H., New Lisbon.
Kratzer, E. F., Peru.
Kremer, F. N., St. Magdalene.
Kremer, Nicholas A., Madison.
Kresler, Arthur R., Rensselaer.
Kuhn, B. F., Elkhart.
Kyle, John J., Indianapolis.

LaBier, C. R., Terre Haute.
Lairy, M. M., Lafayette.
Lamberson, Harry, Connersville.
Lambert, J. C., Colfax.
Lambert, J. L., Brazil.
Lanam, J. H., Franklin.
Landon, H., Remington.
Landon, L. C., Priam.
Lane, W. H., Angola.
Langdon, Harry K., Indianapolis.
Larimore, J. M., Greenfield.
Lathrop, A. A., Lexington.
Laubscher, S. R., Evansville.
Laughlin, C. E., Evansville.
Laughlin, E. D., Orleans.
Laval, W. J., Evansville.
Lawson, W. T., Danville.
Layman, E. W., Terre Haute.
Leach, W. J., New Albany.
Leathers, D. A., Indianapolis.
Leavitt, R., Terre Haute.
Lecrone, Ira, Silver Lake.
Ledbetter, J. M., Michigan City.
Lee, D. F., Zionsville.
Lee, J. H., Rome.
Leedy, C. E., Pierceton.
Leeson, G. M., Wanatah.
Leiter, W. S., Claypool.
Lemmon, S. W., Albion.
Lemon, J. H., New Albany.
Lent, E. J., South Bend.
Letherman, A. P., Valparaiso.
Lett, O. A., Newburg.
Levering, Guy P., Lafayette.
Lewis, George C., Madison.
Lewis, George F., Knightsville.
Libbert, E. J., Aurora.
Lindenberger, Irvin, French Lick.
Lindley, C. M., Brooklyn.
Lindley, Laban, Paoli.
Linegar, John M., Fairfield.
Lingle, S. L., Paoli.
Link, Goethe, Indianapolis.
Link, W. H., Indianapolis.
Linthicum, E., Evansville.
Linville, D. S., Columbia City.
Lisman, J. W., New Lebanon.
Listman, S. J., Oaktown.
Littell, W. R., Cambridge City.
Little, Charles S., Indianapolis.
Little, John A., Logansport.
Little, P. B., Whitestown.
Lockwood, F. W., South Bend.
Lockwood, R. L., Elkhart.
Loehr, E. C., Noblesville.
Logan, A. R., Algiers.
Logan, H. V., New Salem.
Logsdon, W. T., Rockport.
Lohrmann, Henry, Indianapolis.
Long, A. J., Anderson.
Long, Charles R., Pierceton.
Long, H. H., Kingsbury.
Long, H. P., Hartford.
Long, J. B., Indianapolis.
Long, R. W., Indianapolis.
Longanecker, E. W., Anderson.
Longfellow, T. W., Tipton.
Loomis, Charles, Florence.
Loop, A. L., Economy.
Lorimore, John H. C., Hartford City.
Loring, C. J., Rochester.

Loring, D. J., Valparaiso.
Loring, S. C., Plymouth.
Love, J. R., Zenas.
Lowder, L. T., Bloomington.
Lower, M. O., North Manchester.
Luckett, C. D., English.
Luckett, L. P., Terre Haute.
Luckey, J. E., Wolf Lake.
Ludlow, Charles H., Covington.
Lukemeyer, E. G., Huntington.
Lukemeyer, Louis, Huntington.
Lukenbill, O. C., Indianapolis.
Lynch, J. Y., Rosedale.
Lyons, J. H., North Webster.

McAlexander, R. O., Indianapolis.
McAllister, E. B., Terre Haute.
MacBeth, A. H., Ft. Wayne.
MacBeth, Harriet S., Ft. Wayne.
McBeth, Walter, Burnettsville.
McBride, Isaac, Jeffersonville.
McCain, R. C., Kentland.
MacCammon, W., Laurel.
McCarty, M. T., Frankfort.
McCarty, W. W., Canaan.
McCaskey, G. W., Ft. Wayne.
McCaslin, Carl N., Earl Park.
McClain, Leslie, Terre Haute.
McClain, Levi M., Scottsburg.
McClain, W. L., Scottsburg.
McClintock, Charles W., Pittsboro.
McClure, J. W., Butlerville.
McClurg, W. H., Kokomo.
McClurkin, J. C., Evansville.
McConnell, J. E., Carlisle.
McCool, H. E., Evansville.
McCool, W. E., Evansville.
McCormick, W. D., Modoc.
McCoy, George T., Columbus.
McCoy, James N., Vincennes.
McCoy, P. Y., Evansville.
McCracken, A. J., Indianapolis.
McCully, Charles H., Logansport.
McCutchan, J. H., Evansville.
McDonald, A. C., Warsaw.
McDonald, A. J., Bedford.
McDonald, David H., Quincy.
McDonald, J. D., Indianapolis.
McDonald, W. B., New Augusta.
McDowell, James D., Vincennes.
McDowell, L. C., Freelandsville.
McDowell, M. M., Vincennes.
McEvoy, J. B., Ft. Wayne.
McFadden, W. G., Shelbyville.
McFarlin, John T., Williams.
McGaughey, Samuel, Indianapolis.
McGaughey, William, Greencastle.
McGauhey, A. J., Linton.
McGowan, J. W., Oakland City.
McGrew, F. A., Laporte.
McHugh, J. E., Ft. Wayne.
McIlvain, Helen K., Huntington.
McIntire, C. W., New Albany.
McJohnston, W. E., Terre Haute.
McKamy, Anna, New Albany.
McKay, J. D., Marion.
McKee, C. E., Dublin.
Marion, J. F., Indianapolis.
McKee, W. E., Tipton.
McKeenan, R. B., Ft. Wayne.
McKinney, J. W., Bluffton.
McKittrick, Ora K., Plainville.
McMahan, Adah, Lafayette.
McMahan, J. W., Earl Park.
McMillen, W. W. P., Decatur.
McNab, Philip, Indianapolis.
McNamara, D. W., South Bend.
McOscar, E. J., Ft. Wayne.
McPherson, S. L., Montgomery.
McQuown, O. W., Marion.
McShane, John T., Indianapolis.
McShirley, J. L., Sulphur Springs.
McWilliams, O. E., Anderson.
Macer, Thomas, Evansville.
Mackey, C. W., Portland.
Mackey, R. C., Hobart.
Maddox, W. B. S., Vandalia.
Magenheimer, V. A., Waverley.
Magers, F. M., Churubusco.
Magruder, J. W., Peru.
Mallett, C. D., Switz City.
Malone, B. Elizabeth, Indianapolis.
Malone, Louis A., Indianapolis.
Malpas, S. H., Indianapolis.
Mann, E. B., Muncie.
Mansfield, T. J., Royerton.

Maple, J. B., Shelburn.
Maris, A. J., Waterloo.
Maris, J. J., Paoli.
Markle, G. C., Winchester.
Markley, H. W., Bluffton.
Markley, S. C., Richmond.
Marlatt, C. C., Indianapolis.
Marsh, John L., Brownsburg.
Marshall, Coglie, Aurora.
Marshall, D. J., Columbus.
Marshall, R. E., Elwood.
Martin, A., Bellmore.
Martin, A. A., Ridgeway.
Martin, F. A., Commiskey.
Martin, G. F., Corydon.
Martin, J. S., Rolling Prairie.
Martin, Paul F., Indianapolis.
Martin, W. H., Kokomo.
Marvel, Charles, Richmond.
Mason, Charles H., Tell City.
Mason, Charles R., Hartford City.
Mason, George C., Oakland City.
Mason, L., Bluffton.
Mason, Samuel, Pennville.
Masters, J. L., Indianapolis.
Matheney, T. G., Auburn.
Mathews, W. R., Madison.
Mattison, D. E., Marion.
Mattox, W. R., Terre Haute.
Maughmer, G. C., Kokomo.
Mauk, J. R., Cambridge City.
Mavity, D. E., Fowler.
Maxam, F. H., Princeton.
Maxedon, T. H., Vincennes.
Maxwell, Allison, Indianapolis.
Maxwell, F. R., Martinsville.
Maxwell, J. H., Martinsville.
May, A., Crothersville.
May, Vance, Washington.
Mayfield, A. L., Bristow.
Medaris, John W., Brookston.
Meek, J. B., Richmond.
Meek, M. L., Abington.
Mendenhall, E. T., New Castle.
Mendenhall, P. W., Asherville.
Mendenhall, W. O., Richmond.
Mennett, O. H., Columbus.
Mentzer, S. E., Monroeville.
Mercer, J. D., Poe.
Metcalf, H. P., Andersonville.
Metts, A. H., Ossian.
Metts, Fred, Ossian.
Metts, J. I., Ossian.
Meyer, J. H. William, Laporte.
Meyers, Joseph, Alton.
Miles, James, Merom.
Miley, Isaiah, Anderson.
Miller, A., Rensselaer.
Miller, Albert, Holton.
Miller, B. E, Albion.
Miller, C. E., Muncie.
Miller, D. L., Goshen.
Miller, George D., Logansport.
Miller, H. C., Greentown.
Miller, H. L., Leopold.
Miller, James M., Decatur.
Miller, L. C., Alto.
Milligan, J. W., South Bend.
Millis, E. D., Plainville.
Millis, C. C., Redkey.
Mills, Mary, Princeton.
Mills, W. F., South Bend.
Mills, W. H., Boonville.
Minnick, Horace R., Idaville.
Miranda, W. F., Walkerton.
Mitchell, E. E., Avoca.
Mitchell, F. A., New Albany.
Mitchell, H. F., South Bend.
Mitchell, J. J., Canton.
Mitchell, Josephine M., Lafayette.
Mitchell, W. J., North Vernon.
Mitchell, W. K., Ligonier.
Mitchell, W. P., Gaston.
Mock, J. W., Covington.
Modricker, J. M., Wabash.
Moffitt, Wm., West Lafayette.
Molloy, W. J., Muncie.
Monical, G. S., Martinsville.
Montgomery, H. T., South Bend.
Montgomery, Martin, Owensville.
Mooney, H. C., Laketon.
Moore, C. W., Teegarden.
Moore, Emma W., Kokomo.
Moore, E. P., South Bend.
Moore, H. A., Indianapolis.
Moore, J. B., Kokomo.

Moore, John W., Mexico.
Moore, Maurice G., Vincennes.
Moore, N. B., Merriam.
Moore, P. G., Wabash.
Moore, W. M., New Albany.
Moorhead, T. W., Terre Haute.
Morgan, Elmer E., Ft. Wayne.
Morgan, F. B., Huntington.
Moroney, J. H., Winchester.
Morr, J. W., Albion.
Morris, C. C., Rockville.
Morris, J. E., Liberty.
Morris, John E., Indianapolis.
Morris, J. L., Kings.
Morris, John L., Columbus.
Morris, Thos., Mt. Zion.
Morris, W. F., Ft. Branch.
Morrison, F. A., Indianapolis.
Morrison, John S., Lafayette.
Morrow, Joseph E., Indianapolis.
Morrow, Sarah J., Richmond.
Morse, Gertrude, Madison.
Moschelle, J. D., Indianapolis.
Moss, D. F., Winamac.
Moss, W. C., Winamac.
Mottier, G. A., Richmond.
Moulder, J. McLean, Kokomo.
Mountain, Joseph R., Connersville.
Moyer, F. E., Pennville.
Muelchi, William, Tell City.
Mueller, F. M., Lawrenceburg.
Mullinix, P., Cloverdale.
Mumaw, H. A., Elkhart.
Murphy, O. C., Scottsburg.
Murphy, R. M., Elkhart.
Murray, D. P., Dunkirk.
Myers, C. L., Covington.
Myers, William H., Ft. Wayne.

Nanney, W. N., Evansville.
Neal, E. M., Edwards.
Neal, W. A., Elkhart.
Neat, T. C., New Albany.
Neff, J. H., Fairbanks.
Nehrbas, J. G., Winona Lake.
Neier, O. C., Indianapolis.
Neighbor, A. G., Fowler.
Nenneker, E. H., Evansville.
Nesbit, William S., Monitor.
Neu, Charles F., Indianapolis.
Newcomer, M. V. B., Tipton.
Newforth, C., Sunman.
Newhouse, O. A., Hillside.
Newlin, S. C., Anderson.
Newman, H. M., South Milford.
Newman, M. N., Ossian.
Newton, G. O., Dana.
Niblack, E. S., Terre Haute.
Nichols, John, Atherton.
Nieschang, C. C. F., Ft. Wayne.
Nixon, J. E., New Mt. Pleasant.
Noble, T. B., Indianapolis.
Noland, P. D., Kouts.
Norman, J. I., Parkeville.
Norred, W. A., Auburn.
Norrel, J. R., Richmond.
Norrel, J. W., Muncie.
Norris, S. C., Anderson.
Norton, F. D., Petersville.
Norton, William J., Hope.
Nourse, F. P., Alexandria.
Null, L. S., New Haven.
Nusbaum, C. E., Bremen.
Nusbaum, W. H., Auburn.
Nussell, Frederick, Brazil.
Nye, J. H., Cromwell.

Oberlin, T. W., Hammond.
O'Day, J. C., Oil City, Pa.
Oliver, John H., Indianapolis.
Olmsted, F. M., Versailles.
Olmsted, R. T., Versailles.
Osborn, Harry S., Pittsboro.
Osborn, John A., New Winchester.
Osgood, Howard G., Gosport.
Osterman, A. G., Dudleytown.
Ostroff, Henry, Indianapolis.
Otto, A. E., Alexandria.
Outland, Edgar M., Indianapolis.
Overman, C. J., Marion.
Owen, J. E., Evansville.

Paddock, C. A., Portland.
Page, Lafayette, Indianapolis.
Palmer, Adelbert L., Logansport.
Pannenborg, J. C., Hammond.

Pantzer, Hugo O., Indianapolis.
Parker, E. E., Oxford.
Parker, J. J., Merom.
Parker, M. G., Danville.
Parker, O. O., Merom.
Parkison, W. M., Boswell.
Parks, B. W., Bourbon.
Parks, James F., Cumback.
Parr, J. N., Joiletville.
Parrish, J. W., Shelbyville.
Parrish, M. F., Monroe.
Parrish, Rebecca, Logansport.
Parsons, C. H., Rushville.
Pate, J. R., Milan.
Patten, V. C., Morristown.
Patterson, Amos W., Indianapolis.
Patterson, J. W., Fairmount.
Patton, Charles, Terre Haute.
Patton, W. H., Orleans.
Paxton, J. T., Glenwood.
Payne, J. H., Julietta.
Paynter, L. W., Campbellsburg.
Pearlman, Samuel, Stone Bluff.
Pearsa, J. R., Bedford.
Pell, George M., Carbon.
Pendleton, George, Indianapolis.
Perce, B. H., Anderson.
Perdue, C. R., Auburn.
Perkins, O. L., Oolitic.
Perry, Charles, Lewis Creek.
Perry, G. L., Portland.
Peters, D. C., Greentown.
Peters, J. B., Macy.
Peters, W. H., Lafayette.
Petersdorf, Gustave A., Indianapolis.
Petet, Marshall, Veedersburg.
Pettigrew, C. D., Houston.
Pettigrew, D. A., Flat Rock.
Pettijohn, Fred L., Indianapolis.
Pettijohn, Otto B., Indianapolis.
Peyton, David C., Jeffersonville.
Pfaff, John A., Indianapolis.
Pfaff, O. G., Indianapolis.
Pfafflin, Charles A., Indianapolis.
Phares, H. E., Shelbyville.
Phares, J. W., Howell.
Phipps, D. L., Whiteland.
Phipps, J. M., Indianapolis.
Pierson, Allen, Spencer.
Pigman, Garrett, Liberty.
Pinkston, J. M., Milan.
Pirtle, G. W., Carlisle.
Planck, E. A., Union, Mich.
Ploughe, M. L., Elwood.
Ploughe, M. T., Kempton.
Poland, U. G., Muncie.
Pollard, W. S., Evansville.
Porter, Miles F., Ft. Wayne.
Post, B. O., Sulphur Springs.
Pethuisji, P. J., Remington.
Potter, J. E., Milford.
Potter, Theodore, Indianapolis.
Pounder, Malcolm, Elkhart.
Powell, E. H., Valparaiso.
Powell, E. U., Greentown.
Pratt, B. W., Goodland.
Pray, F. M., Indianapolis.
Preston, H. P., Plymouth.
Preston, J. L., Greencastle.
Price, C. R., Monroeville.
Price, E. O., Ladogo.
Price, M. D., Nappanee.
Price, W. A., Nappanee.
Pritchard, Caleb A., Gosport.
Pritchett, W. S., Evansville.
Proegler, Carl, Ft. Wayne.
Proudfit, Louis, Osceola.
Proudley, G. W., Fair Oaks.
Puckett, J. L., Kokomo.
Pugh, F. H., Williamsport.
Pulliam, John M., Logansport.
Purkiser, W. J., Salem.

Quick, W. R., Delphi.
Quillen, S. N., Linton.

Radcliffe, F. E., Bourbon.
Ragan, John S., Plainfield.
Ralston, A. H., New Albany.
Ramsbrok, C. R., Huntingburg.
Ramsey, D. C., Mt. Vernon.
Ramsey, J. P., Vincennes.
Randolph, D. F., Waldron.
Ranke, J. H., Ft. Wayne.
Rankin, T. B., Odon.

Rannells, J. Newton, Rochester.
Rariden, Charles E., Bedford.
Ravdin, M., Evansville.
Rawlings, Sam'l. C., New Harmony.
Ray, C. C., Arcadia.
Ray, C. C., Sanford.
Ray, Frank E., Shelbyville.
Rea, C. S., Falmouth.
Rea, O. A., Culver.
Rea, R. H., Culver.
Read, H. G., Tipton.
Reader, W. H., New Amsterdam.
Reagan, A. W., Mooresville.
Reagan, J. S., Lebanon.
Reagan, R. M., Monon.
Reavis, W. J., Evansville.
Recker, L. H., Morocco.
Redman, L. H., Scipio.
Reed, A. A., Salem.
Reed. J. H., Monticello.
Reeve, Joseph L., Edwardsport.
Reeves, E. W., Burr Oak.
Regennas, E. G., Hope.
Renner, M. E., Urbana.
Reser, William M., Lafayette.
Revis, George F., Lafayette.
Reyer, E. C., Indianapolis.
Reynard, G., Union City.
Reynolds, D. Monroe, Clayton.
Reynolds, Francis M., Montpelier.
Reynolds, James M., Memphis.
Rhamey, B. W., Ft. Wayne.
Richards, Renos H., Patricksburg.
Richards, Samuel D., Patricksburg.
Richards, William R., New Albany.
Richardson, W. H., Vernon.
Richey, Samuel R., Donaldson.
Ridenour, D. C., Peru.
Ridpath, H. W., Indianapolis.
Ried, S. M., Muncie.
Rieman, William H., Millersburg.
Rietz, P. C., Evansville.
Riley, J. H. S., Sardinia.
Rine, E. W., Winchester.
Ristine, W. H., Crawfordsville.
Ritter, C. L., Indianapolis.
Ritter, H. O., Orangeville.
Ritter, J. K., Seymour.
Ritter, Mary, Angola.
Ritter, R. H., Indianapolis.
Ritter, T. B., Orleans.
Roark, C. A., Milton.
Robertson, D. W., Deputy.
Robertson, J. F., Indianapolis.
Robinson, F. C., Martinsville.
Robinson, G. M., Loogootee.
Robinson, H. C., Martinsville.
Robinson, W. B., Indianapolis.
Robison, J. E., Greetingsville.
Rodgers, A. E., Somerset.
Rogers, A. G., Parker City.
Rogers, H. C., Rockville.
Rogers, Joseph G., Logansport.
Roney, David C., Milan.
Roope, A. P., Columbus.
Rose, B. S., Evansville.
Rose, B. A., Linton.
Rose, M. H., Thorntown.
Rosenthal, I. M., Ft. Wayne.
Rosenthal, M. I., Ft. Wayne.
Ross, Alex. A., East Chicago.
Ross, David, Indianapolis.
Ross, George A., Ft. Wayne.
Ross, J. C., Bloomington.
Ross, J. H., Kokomo.
Ross, R. H., Kokomo.
Ross, Rue O., Connersville.
Ross, W. H., Veedersburg.
Rous, Hannah C., Vevay.
Row, George S., Indianapolis.
Rowe, L. M., Indianapolis.
Rowland, George, Covington.
Rubsam, Joseph, Logansport.
Rubush, T. R., London.
Ruddell, I. N., Jeffersonville.
Ruddick, L., Seymour.
Ruhl, W. D., Ft. Wayne.
Runcie, G. H., Poseyville.
Runyan, C. P., Elwood.
Rush, M. A., Anderson.
Rutherford, R. S., New Albany.
Ryker, Charles, Manville.

Salb, J. P., Jasper.
Samuels, William L., Winnemucca, Nevada

Sanders, I. M., Adam.
Sandy, W. J., Martinsville.
Sarner, J. A., Scottsburg.
Sauer, Frederick W., Indiana Harbor.
Saunders, D. R., North Vernon.
Sawyer, F. M., South Bend.
Schaefer, C. R., Indianapolis.
Schaeffer, Geo. C., Bloomington.
Schell, Walker, Terre Haute.
Scherer, S. P., Indianapolis.
Scherfer, J. F., South Bend.
Schilling, Carl, Ft. Wayne.
Schilling, John, Ft. Wayne.
Schillinger, R., Richmond.
Schleiker, A. G., East Chicago.
Schneck, Lula N., Indianapolis.
Schneider, A. L., Ft. Wayne.
Schofield, J. V., Greensburg.
Schoover, William R., Warsaw.
Schrock, H. W., Lagrange.
Schrock, J. J., Scott.
Schuck, John H., Chandler.
Schultz, Guy A., Lebanon.
Schultz, Herman S., Lafayette.
Schultz, W. H., Lebanon.
Schuman, O. V., Columbia City.
Schwartz, W. D., Portland.
Scobey, A. W., Kankakee, Ill.
Scott, Eueidas K., Hartford City.
Scott, John T., Indianapolis.
Scott, J. W. C., Columbia City.
Scott, Noble W., Huntington.
Scott, R. F., Kokomo.
Scott, W. I., Kokomo.
Scudder, Charles P., Washington.
Scull, Eleanor, Hammond.
Seabring, D. A., Auburn.
Seaton, Charles, Martinsville.
Seaton, Guy, Martinsville.
Selman, John W., Greenfield.
Selman, Frank W., Greenfield.
Seneff, J. H., Crystal.
Sensenich, A. S., Wakarusa.
Sessions, S. K., Evansville.
Severin, Louis, Bluffton.
Sexton, John C., Rushville.
Seymour, C. A., Wawaka.
Shackelford, T. J., Warsaw.
Shacklett, W. B., New Albany.
Shaddy, John H., Vevay.
Shafer, J. W., Morocco.
Shafer, W. S., Rochester.
Shaffer, A. W., Huntington.
Shaley, F. W., Terre Haute.
Sharp, Harry C., Jeffersonville.
Sharp, Walter N., Indianapolis.
Sharrer, H. E., Hammond.
Sharrer, Wilbur F., Delphi.
Shaw, H. M., Gaston.
Shaw, S. T., Kimmell.
Sheek, D. W., Greenwood.
Sheets, William H., Jeffersonville.
Shellhamer, D. C., Wabash.
Shepherd, G. W., Redkey.
Shepherd, Vincent, Dupont.
Sherwood, B. M., Linton.
Sherwood, E. T., Linton.
Sherwood, W. C., Mitchell.
Shields, J. M., Seymour.
Shields, J. S., Elizaville.
Shipp, Floyd N., Indianapolis.
Shirley, H. W., Shoals.
Shiveley, A. H., Yorktown.
Shiveley, M. T., Marion.
Shoaf, F. A., Veedersburg.
Shobe, W. A., Ligonier.
Shoemaker, S. A., Poneto.
Shonkwiler, T. M., New Market.
Shook, N. J., Kendallville.
Short, I. W., Elkhart.
Short, John L., Lagrange.
Short, R. B., Bedford.
Short, R. B., Union Mills.
Short, William H., Lagrange.
Showalter, J. E., Waterloo.
Shull, Charles Q., Montpelier.
Shumaker, W. F., Butler.
Sigler, George A., Indianapolis.
Sigmon, E. L., New Albany.
Sigmond, H. W., Crawfordsville.
Simmons, L. A., Kokomo.
Sims, I. G., Portland.
Sims, S. B., Frankfort.
Sipe, J. A., Carthage.
Sipe, R. W., Orange.

Sisson, Ernest R., Maxwell.
Siver, E. L., Ft. Wayne.
Sledd, S. D., Ft. Wayne.
Sloan, John N., Spencer.
Sloan, W. W., French Lick.
Slocum, Stewart, Fortville.
Slonaker, C. L., Leitersford.
Sluss, J. W., Indianapolis.
Smadel, Joseph W., Vincennes.
Smick, C. M., Terre Haute.
Smith, A. F., Wawpecong.
Smith, A. H., Star City.
Smith, C. H., Lebanon.
Smith, C. W., Selma.
Smith, DeLaskie, Lebanon.
Smith, George F., Weisburg.
Smith, Hubbard M., Vincennes.
Smith, Mrs. L. F. J., Wabash.
Smith, L. W., Wabash.
Smith, Martha J., Indianapolis.
Smith, R. H., Kokomo.
Smith, S. E., Richmond.
Smith, S. F., Arlington.
Smith, S. W., Leesville.
Smith, Thomas G., Brownsburg.
Smith, Thurston, Bloomington.
Smith, W. A., Otterbein.
Smith, W. C., Rushville.
Smith, W. H., Rushville.
Smith, W. H., Bedford.
Smoot, D. Brooks, Washington.
Snapp, J. A., Goshen.
Snider, J. W., Fairland.
Snider, Warren, Fairland.
Snyder, Alonzo D., Miles, Wash.
Snyder, E. R., Troy.
Somers, Joseph L., Vincennes.
Sommer, E. F., Indianapolis.
Sourwine, John D., Brazil.
Sowder, Charles R., Indianapolis.
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Spaulding, L. A., Bluffton.
Spear, Robert, East Chicago.
Spencer, M. J., Indianapolis.
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Spickermon, H. R., Muncie.
Spigler, O. R., Terre Haute.
Spillman, F. J., Connersville.
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Spink, T. F., Washington.
Spink, Urbana, Indianapolis.
Spinning, A. L., Covington.
Spitler, Charles E., Saratoga.
Spohn, G. W., Elkhart.
Spooner, Jared, Peru.
Spoor, John, Brooklyn.
Spradley, N. M., Tennyson.
Springston, C. E., Selvin.
Spurgeon, Cornelius, Kossuth.
Spurgeon, O. E., Muncie.
Staley, L. B., Bicknell.
Staley, Thomas M., Bicknell.
Stalker, Bodine, Borden.
Stallings, F. L., Caborn.
Stark, H. W., Holland.
Stark, J. W., Evansville.
Starr, W. L., New Albany.
Stauffer, Edwin R., Hammond.
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Stemen, G. B., Ft. Wayne.
Stemm, W. H., North Vernon.
Stephenson, C. E., Terre Haute.
Sterne, Albert E., Indianapolis.
Stevens, B. C., Logansport.
Stevens, H. C., Star City.
Stevens, R. C., Plymouth.
Stevenson, D. W., Richmond.
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Stewart, Clark B., Vincennes.
Stewart, Jonas, Anderson.
Stewart, O. H., Orleans.
Stillson, Jos. O., Indianapolis.
Stinson, A. E., Athens.
Stipp, F. E., Bedford.
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Stoltz, Charles, South Bend.
Storch, L. A. E., Indianapolis.
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Stotlemyer, C. I., Hagerstown.
Stout, O. L., Upland.
Stover, C. J., Eaton.
Strickland, Geo., Francisco.
Strickler, S. L., Boggstown.
Stroube, C. N., New Maysville.

Stroupe, C. C., Mishawaka.
Stuart, Robert, Spiceland.
Stucky, Frederick V., Gosport.
Stucky, John M., Gosport.
Study, J. N., Cambridge City.
Stultz, J. E., Ft. Wayne.
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Sturdivant, M. G., Chestnut Hill.
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Summers, O. R., Middletown.
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Suttner, C. N., Elwood.
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Swarts, Vesta M. W., Auburn.
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Sweet, Otis, Martinsville.
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Taylor, D. B., Ft. Wayne.
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Taylor, E. C., Winslow.
Taylor, James A., Montpelier.
Taylor, J. E., Leopold.
Taylor, James H., Indianapolis.
Taylor, T. H., Evansville.
Taylor, U. T., Newburg.
Tea, R. S., Lafayette.
Teaford, S. F., Paoli.
Tebault, W. P., New Albany.
Tepe, G. W., Evansville.
Terflinger, T. W., Logansport.
Terhune, R. W., Whiteland.
Terrell, L. B., Anderson.
Terrell, W. H., Stilesville.
Terry, C. C., South Bend.
Teters, B. F., Middlebury.
Thayer, M. N., Linton.
Thiebaud, Hugh M., Vevay.
Thixton, E. D., Sullivan.
Thomas, Charles E., Leesburg.
Thomas, Charles L., Logansport.
Thomas, James, Evansville.
Thomas, J. J., Winamac.
Thomas, P. B., Decatur.
Thomas, R. M., Greensburg.
Thomas, S. C., Milroy.
Thomas, William, Greensburg.
Thomas, W. H., Elkhart.
Thompson, D. A., Indianapolis.
Thompson, Frank, Lafayette.
Thompson, G. W., Winamac.
Thompson, J. L., Indianapolis.
Thompson, N. H., Wabash.
Thompson, W. H., Matthews.
Thompson, W. H., Winamac.
Thompson, W. L., Mooresville.
Thompson, W. N., Sullivan.
Thornburg, F. R., Middletown.
Thorne, J. C. F., Kokomo.
Thorner, Moses, Indianapolis.
Thornton, Walter E., Montpelier.
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Thralls, R. T., Hymera.
Throckmorton, G. K., Lafayette.
Tilford, A. S., Martinsville.
Tindall, E. F., Muncie.
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Todd, Robert N., Indianapolis.
Tolliver, J. A., French Lick.
Tomlin, W. S., Indianapolis.
Tomlinson, C. H., Cicero.
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Tourner, J. P., Bloomington.
Townsend, R. C., Osgood.
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Trenary, D. F., Modoc.
Trent, I. N., Muncie.
Treon, James F., Aurora.
Trueblood, Charles, Anderson.
Trueblood, J. C., Loogootee.
Truitt, F. L., Noblesville.
Tubbs, George K., Alfordsville.
Tucker, Arthur W., Logansport.

Tucker, A. R., Noblesville.
Tucker, F. A., Noblesville.
Tucker, D. W., Ft. Wayne.
Tucker, G. W., Dana.
Tucker, H. G., Cromwell.
Tucker, W. W., Greencastle.
Turner, Harriet E., Indianapolis.
Turner, S. R., Hammond.
Tyler, John L., Mexico.
Tyner, S. L., Boonville.

Ulmer, D. R., Alexandria.
Umberhine, C. D., Reese Mills.
Urquhart, R. T., South Bend.

Van Buskirk, E. M., Ft. Wayne.
Vancleave, M. B., Terre Haute.
Vancleave, R. H., Farmersburg.
Vanderburg, J. M., Albany.
Van Matre, C. E., New Castle.
Van Nuys, Mary M., Lebanon.
Van Osdol, D. D., Rushville.
Van Pelt, George F., Connersville.
Van Sant, W. P., Brooklyn.
Van Sweringen, B., Ft. Wayne.
Van Sweringen, G., Ft. Wayne.
Van Sweringen, H., Ft. Wayne.
Varble, W. M., Jeffersonville.
Varier, J. A., South Bend.
Varner, G. W., Evansville.
Varner, R. D., Kokomo.
Varner, W. T., Evansville.
Vaughan, I. J., Topeka.
Vaughn, Martin, Hammond.
Veasey, W. M., Avilla.
Verwayne, E. J., Evansville.
Vickery, C. R., Valparaiso.
Viehe, C. G., Evansville.
Viehe, C. H., Evansville.
Vinton, A. E., Muncie.
Von Baranda, Oscar, South Bend.
Voris, S. M., Columbus.
Voyles, H., Bedford.

Wade, F. C., Lima.
Wadsworth, W. W., Muncie.
Wagner, T. A., Indianapolis.
Wahl, G. F., Bremen.
Wainscott, O. C., Peru.
Walker, Edwin, Evansville.
Walker, Jas. H., Henryville.
Walker, W. H., Portland.
Walker, W. O., Wolcott.
Walker, Wm. S., Lafayette.
Wall, Charles T., Washington.
Wallace, B., Franklin.
Wallace, J. C., Ft. Wayne.
Wallage, George W., Middletown.
Waller, W. H., Angola.
Walls, J. W., Eckerty.
Walser, J. A., Anderson.
Walter, F. J., Kramer.
Walters, C. R., Paxton.
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Ward, Clay L., New Palestine.
Ward, J. M., Kewana.
Ward, J. O., Peru.
Ward, John P., Vevay.
Ward, O. A., Indianapolis.
Wardner, Horace, Laporte.
Ware, C. M., Greentown.
Warren, C. L., Chesterton.
Warren, F. R., Michigan City.
Warter, Philip, Evansville.
Washburn, A. A., Terre Haute.
Washburn, H. A., Freetown.
Washburn, I. M., Rensselaer.
Washburn, P. E., Buffalo.
Washburn, S. S., Lafayette.
Washburne, G. F., Elkhart.
Waters, S. C., Middletown.
Watters, P. J., Indianapolis.
Watts, E. K., Richmond.
Weathers, J. F., New Albany.
Weaver, B. P., Ft. Wayne.
Webber, I. B., Warsaw.
Webster, J. C., Lafayette.
Wedding, M. F., Rome.
Weer, H. H., Indianapolis.
Weever, J. B., Evansville.
Wegner, W. G., South Bend.
Weidner, Calvin, Manchester, Conn.
Weinstein, Joseph, Terre Haute.
Weinstein, L. J., Terre Haute.
Weir, C. T., Bloomington.
Weir, S. D., Terre Haute.

Weiss, H. G., Lamar.
Weist, H. H., Richmond.
Welborn, J. Y., Evansville.
Welch, D. W., Mt. Vernon.
Welch, Jno. A., Letts.
Welch, O. F., Westport.
Wellborn, G. W., Stewartsville.
Weller, J. E., Richmond.
Werner, J. F., Elkhart.
Wertz, T., Evansville.
West, E. A., Folsomville.
Westfall, A. B., Lafayette.
Westover, R. Leland, Indianapolis.
Wetherell, R. B., Lafayette.
Wharton, J. O., Exchange.
Wharton, W. L., Matthews.
Wheeler, H. H., Indianapolis.
Wheelock, K. K., Ft. Wayne.
Whery, Mary A., Ft. Wayne.
Whery, W. P., Ft. Wayne.
Whetsell, L. C., Bloomington.
White, B. S., Greensburg.
White, Charles A., Danville.
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White, David, Tobinsport.
White, R. P., Ft. Wayne.
White, William C., Indianapolis.
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Whitledge, G. A., Anderson.
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Whitson, E. M., Jonesboro.
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Wiggins, D. S., Losantville.
Wilcox, F. H., New Albany.
Wilcox, F. T., Laporte.
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Wiles, Frank M., Indianapolis.
Wiley, Harriet, Portland.
Wilkins, S. V., Roanoke.
Willan, R. D., Trafalgar.
Willan, W. G., Kendallville.
Willeford, George W., Washington.
Willetts, A. J., Lowell.
Williams. Alice B., Columbia City.
Williams, A. L., Greensburg.
Williams, Charles, Anderson.
Williams, C. S., Columbia City.
Williams, Franklin A., Cuba.
Williams, G. T., Crawfordsville.
Williams. J. B., Wabash.
Williams, James L., Indianapolis.
Williams, J. S., Macy.
Williams, L. O., Anderson.
Williams, T. B., Angola.
Williams, W. H., Lebanon.
Williamson, R. B., Paragon.
Willien, Leon J., Terre Haute.
Willis, J. H., Evansville.
Wilson, Amos L., Indianapolis.
Wilson, Dalton, Yankeetown.
Wilson, D. W., Argos.
Wilson, H. W., Michigan City.
Wilson, James, Wabash.
Wilson, L. A., Michigan City.
Wilson, M. C., Lafayette.
Wilson, R. J., Salem.
Wilson, R. S., Berne.
Wilson, T. W., New Harmony.
Wilson, W., Yankeetown.
Wilson, W. L., Scipio.
Wiltfong, C. O., Chesterton.
Wiltshire, J. W., Bloomington.
Wilton, I., Evansville.
Winans, H. M., Muncie.
Winders, L. C., Elizabeth.
Winstandley, W. C., New Albany.
Wishard, E. E., Noblesville.
Wishard, J. M., Greenwood.
Wishard, W. H., Indianapolis.
Wishard, W. N., Indianapolis.
Wisner, W. E., Columbus.
Witting, A. P., St. Joseph.
Wolfe, F. E., Jeffersonville.
Wolfe, A. S., New Albany.
Wolfe, F. E., Lanesville.
Wolfe, Z. C., Corydon.
Wolferman, A. G., Indianapolis.
Wellenmann, A. G., Ferdinand.
Wood, E. U., Columbus.
Wood, H. D., Angola.
Wood, J. M., Greensburg.
Wood, N. S., Anderson.
Wood, T. F., Angola.

Wood, W. F., Mishawaka.
Wood, W. W., Angola.
Wooden, E. I., Rushville.
Woollen, G. V., Indianapolis.
Woollen, L. J., Vevay.
Woolery, Perry, Heltonville.
Work, J. A., Elkhart.
Worsham, L., Evansville.
Wray, John T., New Albany.
Wright, B. C., Indian Springs.
Wright, C. E., Indianapolis.
Wright, Charles L., Huntington.
Wright, C. R., Frankton.
Wright, Ervin, Huntington.
Wright, Jacob E., Cambridge City.
Wright, J. W., Kokomo.
Wright, M. R., Knox.
Wright, Thomas, Boonville.
Wright, William M., Indianapolis.
Wyatt, A. R., Lagrange.
Wyburn, D. C., Sheldon.
Wynn, Frank B., Indianapolis.

Yager, E. J., Graysville.
Yarling, J. E., Peru.
Yencer, M. W., Boston.
Yenne, C. H., Washington.
Yockey, D. H., Blountsville.
Yocum, Boaz, Coal City.
Yoder, A. C., Goshen.
Young, Franklin, Richmond.
Young, J. B., Cicero.
Young, J. R., Terre Haute.
Young, S. J., Terre Haute.
Young, S. J., Valparaiso.
Youngblood, E. L., Boonville.

Zaliski, Joseph P., South Bend.
Zaring, C. T., Greencastle.
Zaring, P. A., Bloomington.
Zimmerman, J., Lynnville.
Zinn, G. E., Elkhart.
Zuerner, Joseph, Jeffersonville.

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Andrew, George L., Chicago.
Bare, John W., Salem.
Brooke, Jared E., Plymouth.
Burrage, S., W. Lafayette.
Chatard, Rt. Rev. Bishop, Indianapolis.
Cisna, W. R., Chicago.
Compton, J. W., Evansville.
Coulter, Stanley, Lafayette.
Darling, N. S., Laporte.
Day, B. J., Evansville.
Field, M. H., Indianapolis.
Fitzpatrick, J. C., Dunkirk.
Florer, T. W., Texas.
Furniss, H. W., Bahia, Brazil.
Gould, Vernon, Rochester.
Hacker, T. S., Indianapolis.
Hervey, J. W., Indianapolis.
Jameson, P. H., Indianapolis.
Kelley, F. H., New Harmony.
Kimball, A. D., Nat. Mil. Home, Marion.
Kitchen, J. M., Indianapolis.
Lewis, E. R., Washington, D. C.
Miller, Harry, N. M. Home, Marion.
Mulhausen, M., Evansville.
Oatley, John H., New Philadelphia.
Pate, J. R., Milan.
Powell, J. Z., Logansport.
Ralston, W. G., Evansville.
Reed, Charles B., Chicago.
Robb, J. W., Indianapolis.
Schuyler, P. L., Evansville.
Walling, Willoughby, Chicago.
Waterman, L. D., Indianapolis.
Williams, Lewis, Marion.
Wiseman, Sumner, Culver.

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